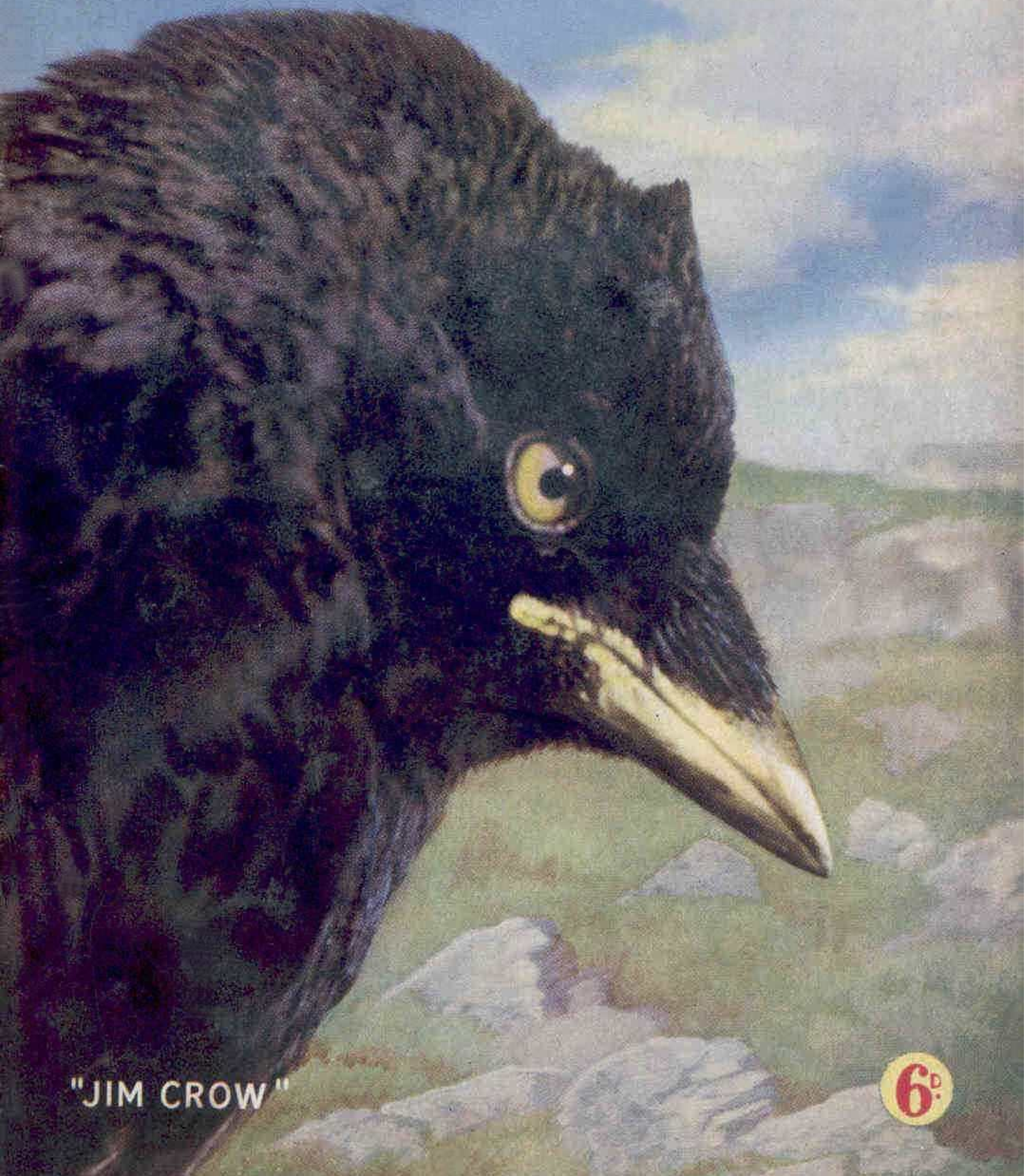
VOL. XXVIII. No. 5 MAY 1943

MECCANO MAGAZINE



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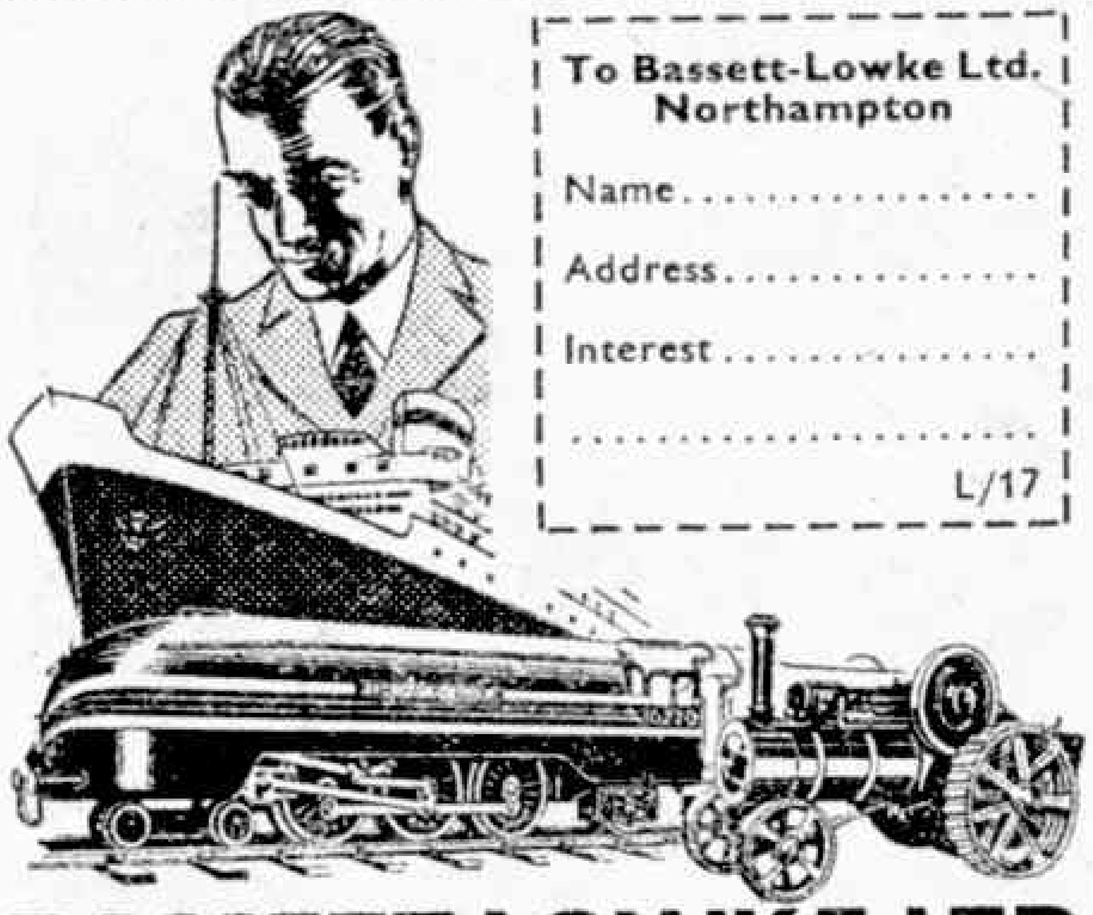

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Vol. XXVIII
No. 5
May 1943

With the Editor

Wind and Tide

On page 162 of this issue is an interesting article on an unusual form of windmill. We are all familiar with the windmills, with their great spreading wings mounted on towers, that were in use for centuries. We regret the disappearance of these picturesque relics of the days before the coming of coal and oil as sources of power, just as we miss the graceful sailing ships of former days; and sometimes we wonder if wind power will ever come into its own again. Wind is cheap and always with us, and inventors continue to try out schemes for making use of it; but probably it will not be pressed into service on a big scale until our coal and oil supplies are exhausted, and that is a long way off.

By that time the power of the tides may be utilised by storing the water behind huge dams in estuaries and releasing it through turbines. In this country a tidal power scheme in connection with the estuary of the river Severn has been proposed and strongly supported by many experts. I hope shortly to have an article on this and other interesting schemes for harnessing the tides.

Leaders in the War

Sir Bernard C. Freyberg, V.C.

Major-General Sir Bernard Cyril Freyberg was born in London in 1890 but was brought up and educated in New Zealand. In 1909 he obtained a commission in the 6th Harauki Regiment, N.Z. Military Forces, and on the outbreak of the 1914-18 war he transferred to the British Army. He served throughout that war with great distinction. In France he gained the V.C. at the battle of the Somme, when in spite of being wounded four times he personally led his men to the capture of a village and 500 prisoners. From 1929 to 1931 he commanded the 1st Battn. Manchester Regiment, and from 1931-3 he was Assistant Quartermaster General, Southern Command.

Major-General Sir Bernard Cyril Freyberg, V.C., K.B.E., C.M.G., D.S.O.

He retired in 1937, but returned to active service in 1939 and was given command of the 2nd New Zealand Expeditionary Force. He was Commander-in-Chief in Crete in May 1941, and since then has commanded the New Zealand force operating with the Eighth Army in the Western Desert and Tunisia.

Outside wars he is a keen yachtsman.

Some Birds I Have Met

By H. Auger

ONE of the most widely distributed birds to-day is the jackdaw; with its cheek and cunning it thrives where other birds of the same family, the crow family, have been forced to retreat. In small towns and villages it may be seen scavenging the streets and gardens for food, frequently pilfering from the starlings and sparrows. Habitually nesting in holes, the jackdaw is well catered for in towns at any rate, churches and ruins being well frequented as well as bridge structures.

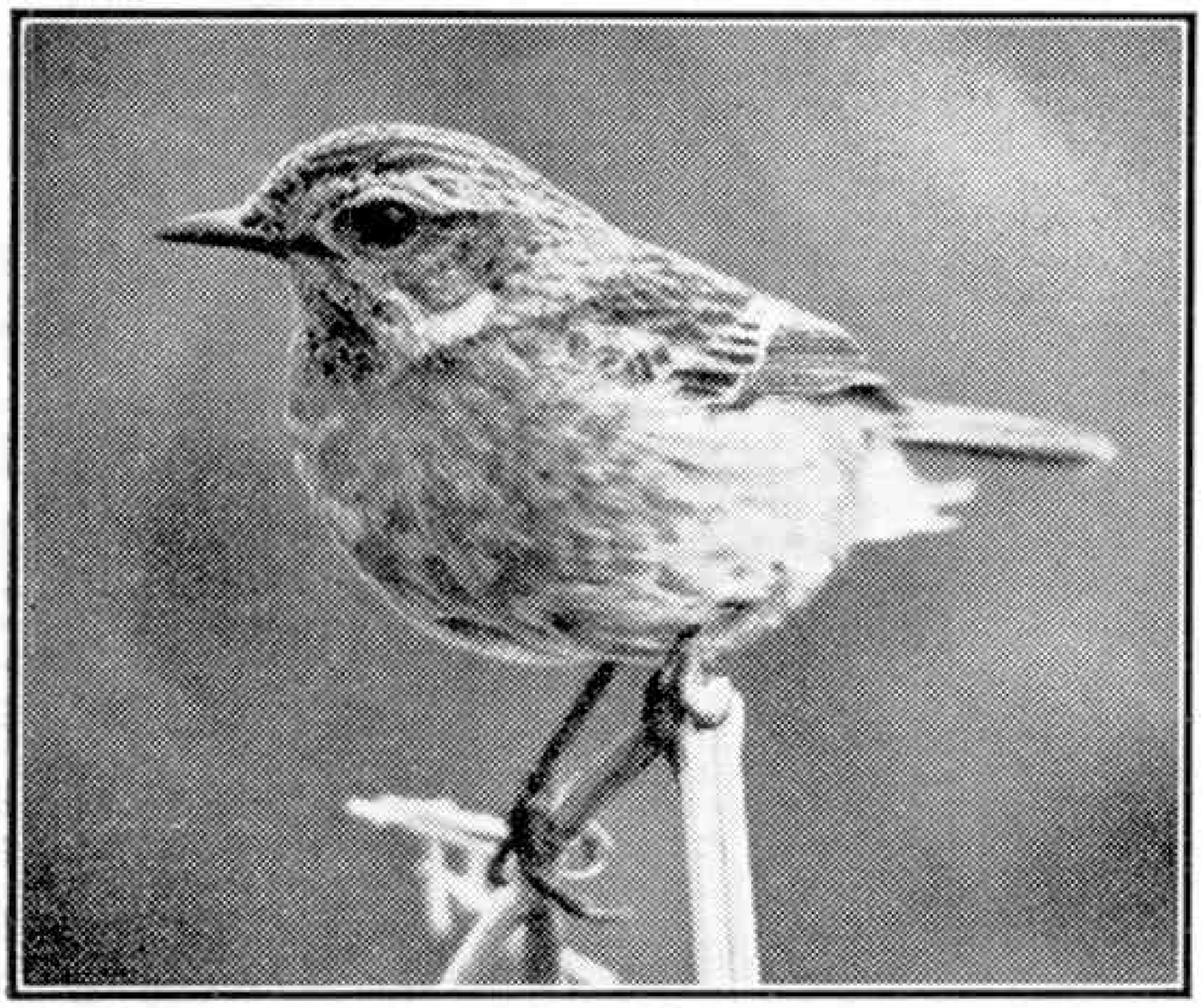
Chimneys have a special appeal as nesting holes, and in spring and early summer a jackdaw on top of a chimney is well worth watching. If the chimney contains a nest the jackdaw will be seen to suddenly "up-end" and take a header down the pot; after a few seconds, if young are in the nest, it will pop up again just as suddenly. The observer is immediately set thinking how the bird manages to fly up and out again, and to think still more how the young leave the nest. Chimneys leading from bedrooms where fires are seldom used are usually chosen, although they may be in a stack with others which are used every day. The nest is made on a huge collection of sticks and paper at the bottom of the shaft and usually at the back of the fireplace.

In country districts holes in trees are used for nesting sites, several pairs often sharing a large hollow tree. If living in barren and isolated districts the daw easily adapts his home life to a house in the rocks or cliffs, or will even command a rabbit burrow.

It was the stealing of a desirable hole in the ground made by some other creature, in a barren district, that led to the taking of the jackdaw's portrait that appears on this month's cover. Daws, in common with other members of the crow tribe, are notorious egg thieves. I was watching and recording the number of times this particular bird entered puffin burrows in search of eggs. The time of disappearance down each burrow was barely three seconds, the exit usually being very much more hurried than the entry, no doubt because Mr. Daw knew how Mrs. Puffin could nip. After entering one hole the egg thief was still down after about five minutes, so I left my hiding place to investigate, thinking that probably he had been overcome by some defending puffin. However, on reaching the hole and inserting my arm I was very surprised to find not two birds but six, all of which were very much alive. This particular hole contained the jackdaw's nest. I promptly took advantage of the capture and removed the adult to take its photograph. Having done this I told it what a crook it was and tossed it into the air. From there no doubt it would quickly resume its dark career, unless indeed the indignity of being captured and photographed caused it to repent, like its famous predecessor, the Jackdaw of Rheims, which became so very very good that it was made a saint under the name "*Jim Crow.*"

Cock Stonechat

In the same district I also watched a pair, from a distance of twelve yards,



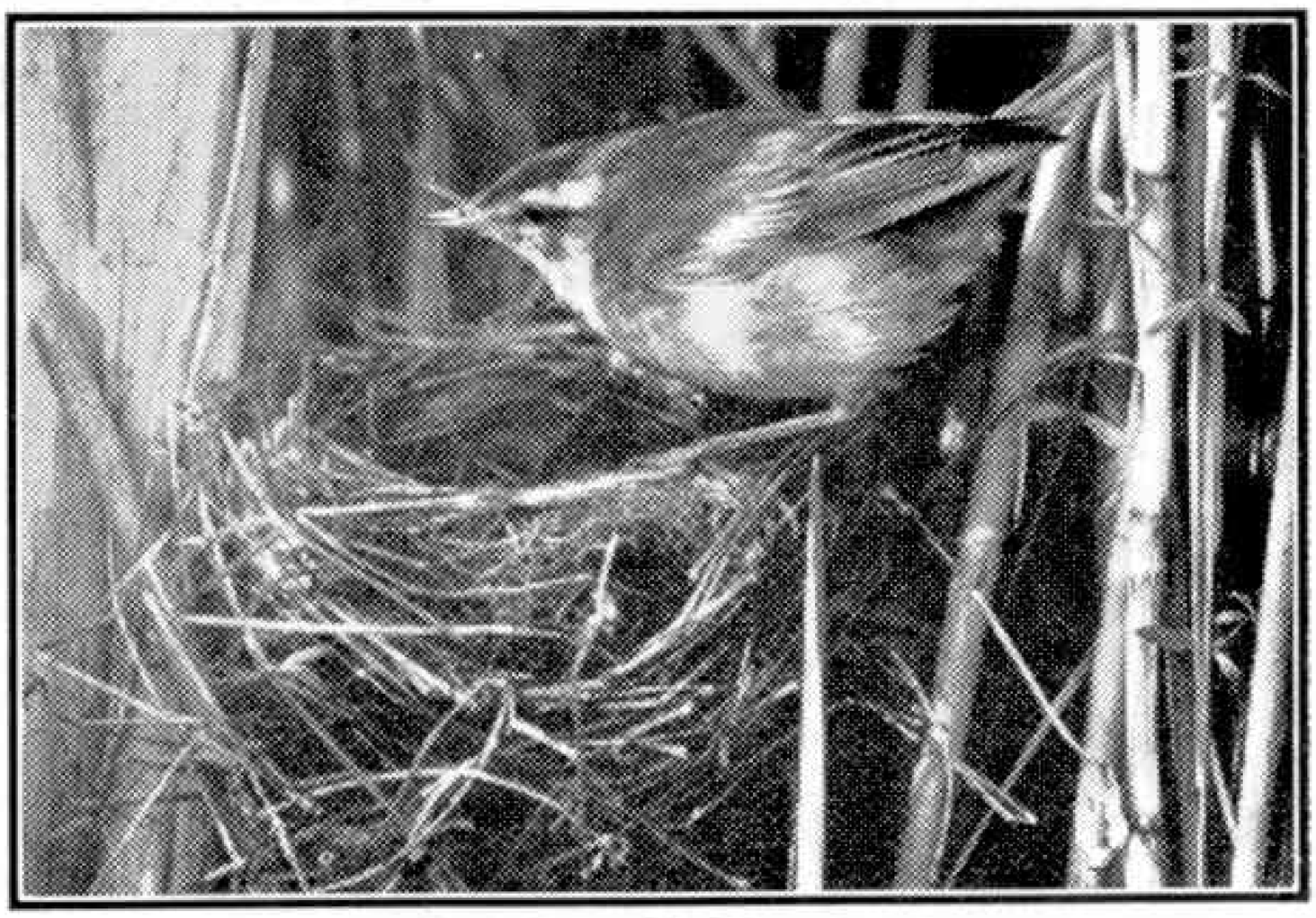
Hen Stonechat

settle on a kittiwake's nest, peck open the egg, and clumsily suck about a quarter of the contents, while a neighbouring kittiwake calmly looked on from its own nest only a yard away. Seabird colonies are often haunted by parties of these gangsters, who hop about quite casually along the ledges watching for any untended eggs, usually without any opposition or deterrent. Fortunately in towns and villages the numerous jackdaws there do not have to resort to such savagery in the efforts to find food, although, given the opportunity, I do not think they would hesitate.

We all know the confiding little robin which frequents our back gardens, but how many of us have been as well acquainted with its close relation the stonechat? Although found in many parts of Britain, it has a partiality to scrubby heaths and commons, areas which are rarely disturbed. This type of country appears to be half-way between that occupied by its other close relations the wheatear and the whinchat; the wheatear carrying on in the wilder moorland districts while the whinchat shows a preference for the richer vegetation offered by areas not incapable of cultivation.

Once a pair of stonechats have been found they will rarely be very far from where they were first seen, as they are rather sedentary and are content to live in a fairly restricted area. Having located this area, it might be imagined the finding of the nest would be easy; actually the opposite is the case. At the first approach of danger, the cock, keeping a vigilant watch perched on some prominent bramble or spray of bracken, pipes his warning note and the hen slyly leaves the nest. The cock then takes up his characteristic "chack, chack," the call after which he is named. This call, together with his striking black head, white collar, and chestnut breast, are sufficient to draw the attention of the intruder away from the nest. Anyone wishing to locate the nest must ignore the cock and focus all his attention on the hen, who by this time will not be very far from the cock. By careful watching from a distance, her eagerness to be back on the nest will frequently cause her to disclose its position. Even when the hen has been watched to return in this manner, and the position of the nest tied down to a few square yards, a careful search of the thick coarse herbage is necessary to avoid trampling the eggs or young.

Once the young are hatched they are fed at a great rate; the pair of birds illustrated gorged their chicks on a diet of spiders and small green caterpillars. Their habit of settling on a spray of dead bracken before dropping to the nest provided an ideal spot on which to focus the camera, and their frequent visits

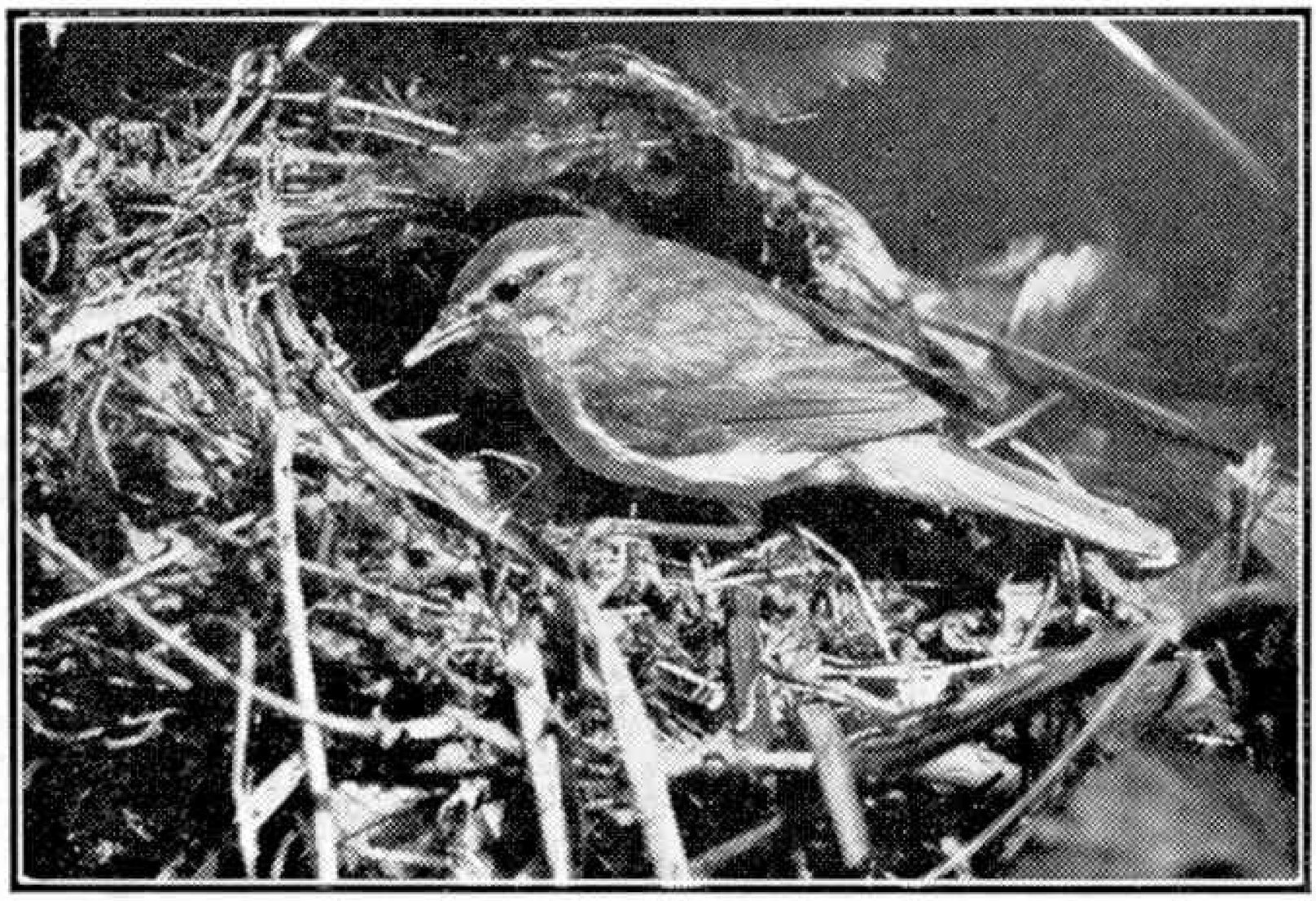


Cock Sedge Warbler at nest

offered a variety of poses.

Reed beds and marshes always have a high population of birds all the year round, as they offer a good food supply and a fair amount of cover. Here, as in many other places, one's attention is usually devoted to the larger, more obvious birds, which in Spring and Summer may include heron, duck, and members of the wader family. A casual glance is all that may be received by the small inconspicuous brown birds flitting from stem to stem in the reeds. These are sedge warblers, and if the nest of a pair of these is approached they strike up a loud and forceful chatter. It is the loudness of this chatter in proportion to the very small size of these mouse-like birds that then holds one's attention. A careful look will probably show that the bird possesses a light stripe over the eye, and this distinguishes it from its neighbour and close relation the reed warbler, which also may be in the same district.

Sedge warblers are very confiding, and by taking up a position near a nest the observer will be well repaid for his patience in keeping still for a few minutes, as one of the pair will quickly return. So silently are they able to weave a way in and out of the thick and tangled reeds that their proximity is often only disclosed by a soft "chit." Occasionally, as if trying to draw the intruder off, one will climb to the top of a reed into full view. This climb catches the eye, as the bird is so agile with its legs and very flexible toes that it appears to slide up the reed stem. Only rarely are the wings used when moving about the reed beds; in fact when the birds are settled down after migration only very short hops of a few yards appear to be undertaken.



Cock Willow Warbler

The nest is loosely constructed of grass and hair and is frequently found over water. I once disturbed a nest of fledging sedge warblers still unable to fly, the nest being poorly suspended a foot above deep water in tall reeds. All four occupants immediately left the nest, and I was surprised how easily they hurried away; their ability to jump both across and up the reeds was remarkable. On passing the same nest half an hour later I was still more surprised to find all four birds back again. The less common reed warbler does not appear to possess the same pep and vitality nor the same ability to creep in and out of the reeds as the more adaptable sedge warbler.

Many small birds are always found on the outskirts of woods and small copses, which to the casual wanderer are just "little brown birds." A large proportion of these birds are warblers, and a single small wood may contain anything up to seven different species of this family. Few of the actual numbers of birds will be seen by merely walking about, but by standing still, the normal life of the wood quickly restores itself and it is surprising how little attention is paid to what a few minutes before was a cause of alarm.

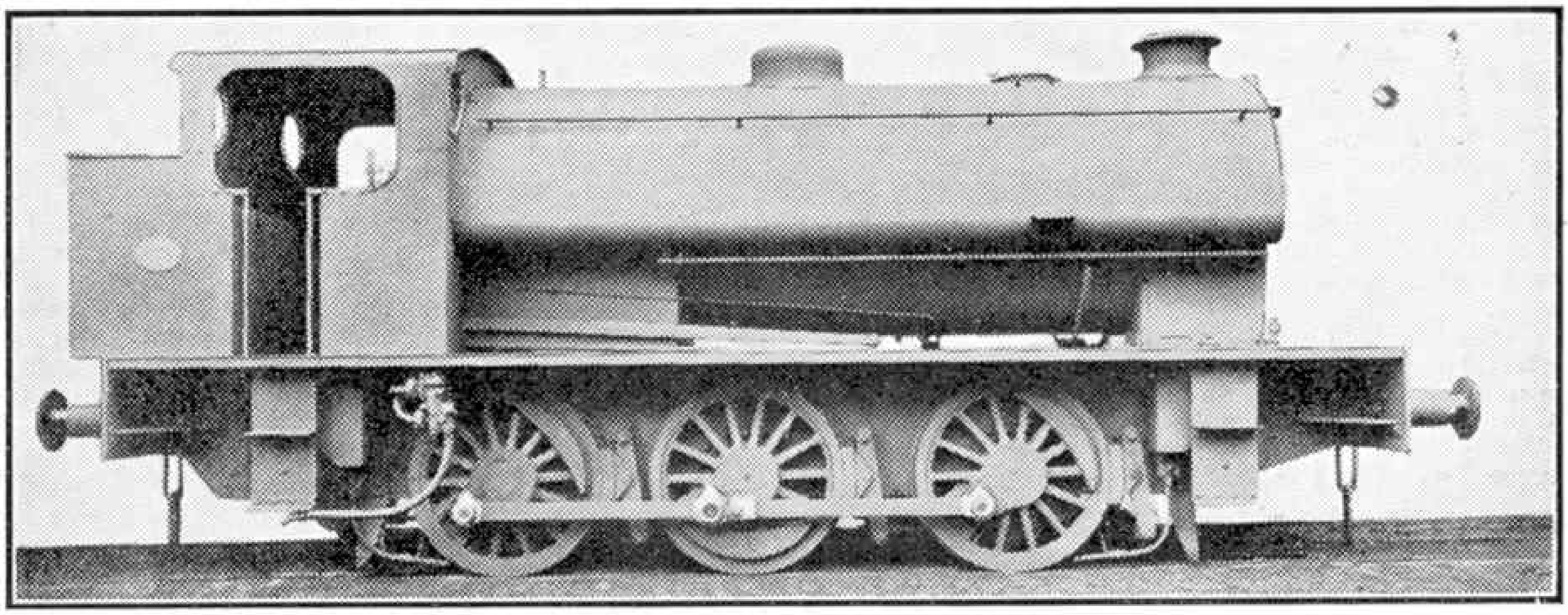
Some of the warblers are so much alike that it is only by close watching that identification is certain. To see if the legs of a bird are dark enough to belong to a chiffchaff or light enough to be those of a willow warbler, for instance, one has to be within a few feet, and this happens to be the most marked visual difference between these two common species. The nests of these two particular birds are also very similar, being large semi-domed structures and placed usually near the ground; to add to the uncertainty of identity the eggs of each species are indistinguishable. Should the nest of any warbler be found, and the identity of the bird be uncertain at the time of discovery, a careful approach to the nest some time later will usually provide a close-up view of the sitting bird, as warblers sit tight when on the nest.

Incidentally the illustration of the sedge warbler and its flimsy nest makes an interesting comparison with the bulky home of the slightly smaller willow warbler. These variations are difficult to account for, as the garden warbler, which is larger than either of the warblers illustrated, builds a very much smaller but stronger nest of hair, yet so thin that it can be seen through.

The willow warbler shown here was watched on and off from the time the first egg was laid to the young birds leaving the nest, and the photograph was taken three days after the young were hatched. When sitting, the hen bird would allow the nest to be touched before slipping out a yard or so into the thick surrounding undergrowth; never did it fly away from the nest. During all the time they were observed, both cock and hen moved about as though being hunted, creating a rather pathetic atmosphere, totally different from the almost cheeky sedge warblers. Later, when feeding the chicks, the parents also seemed rather cheerless and rarely sang. When bringing the small grubs to the nest both cock and hen approached and left it by creeping through the surrounding grass and bramble.

Most of our small birds remain unseen unless they are searched for, as it must be realised that they see us first and naturally take steps to avoid us; the advantages of remaining unseen are all on their side. When watching a bird it is soon found that it does not have to be covered in bright feathers to be interesting, and it is well known that our finest songsters are dull in plumage. An hour or so spent in quiet observation of some of our less assuming birds will provide pleasant entertainment and an appreciation of their trials and triumphs in the efforts to survive.

Anyone who is a little uncertain of the identity of some of the birds which may be found will find the illustrated Observers' Book of British Birds, published by Warne and Co. at 3/6, a great help, its small size being designed for taking out in the pocket. With the aid of an immediate reference such as this when out of doors, doubtful identifications are cut to a minimum as there is usually a chance to get a second look at the bird after consulting the book.



The new Saddle tank "Austerity" locomotive, a simple and robust design developed from an industrial type. Photographs by courtesy of the Ministry of Supply.

A Saddle Tank "Austerity" Locomotive

BRITISH locomotive firms have recently received orders from the Ministry of Supply for considerable numbers of "Austerity" 0–6–0 saddle tank locomotives. Through the courtesy of the Minister of Supply, who is responsible for this new design, we give photographs and a description of the first of these locomotives, which are notably straightforward and robust in design. Every opportunity has been taken to simplify construction and to avoid the use of materials in short supply.

The locomotives are capable of shunting trains of 1,000 tons, also of dealing with military trains and mixed traffic generally for short journeys. The design closely resembles that of a British locomotive builder's standard 18 in. cylinder industrial locomotive, many of the parts being interchangeable.

The design follows closely the heaviest type of industrial locomotive, modified to meet the more general work now in view. The inside cylinders, placed between the deep plate frames, give great strength and immunity from damage in the event of derailment or minor accidents. They have a diameter of 18 in. and a stroke of 26 in. The drive is to the second axle, and the slide valves, located between the cylinders, are operated by a straightforward Stephenson's link motion, controlled by a hand reversing lever on the right side of the cab. The driving wheels have a diameter of 4 ft. 3 in. Their centres are of cast iron, with hardened steel crankpins pressed into them, and a notable departure in the interests of economy is the use of cast iron bushes in the coupling rods in place of adjustable split brasses. Steel castings have been reduced to an insignificant minimum, and simplicity has been achieved with success without sacrificing efficiency.

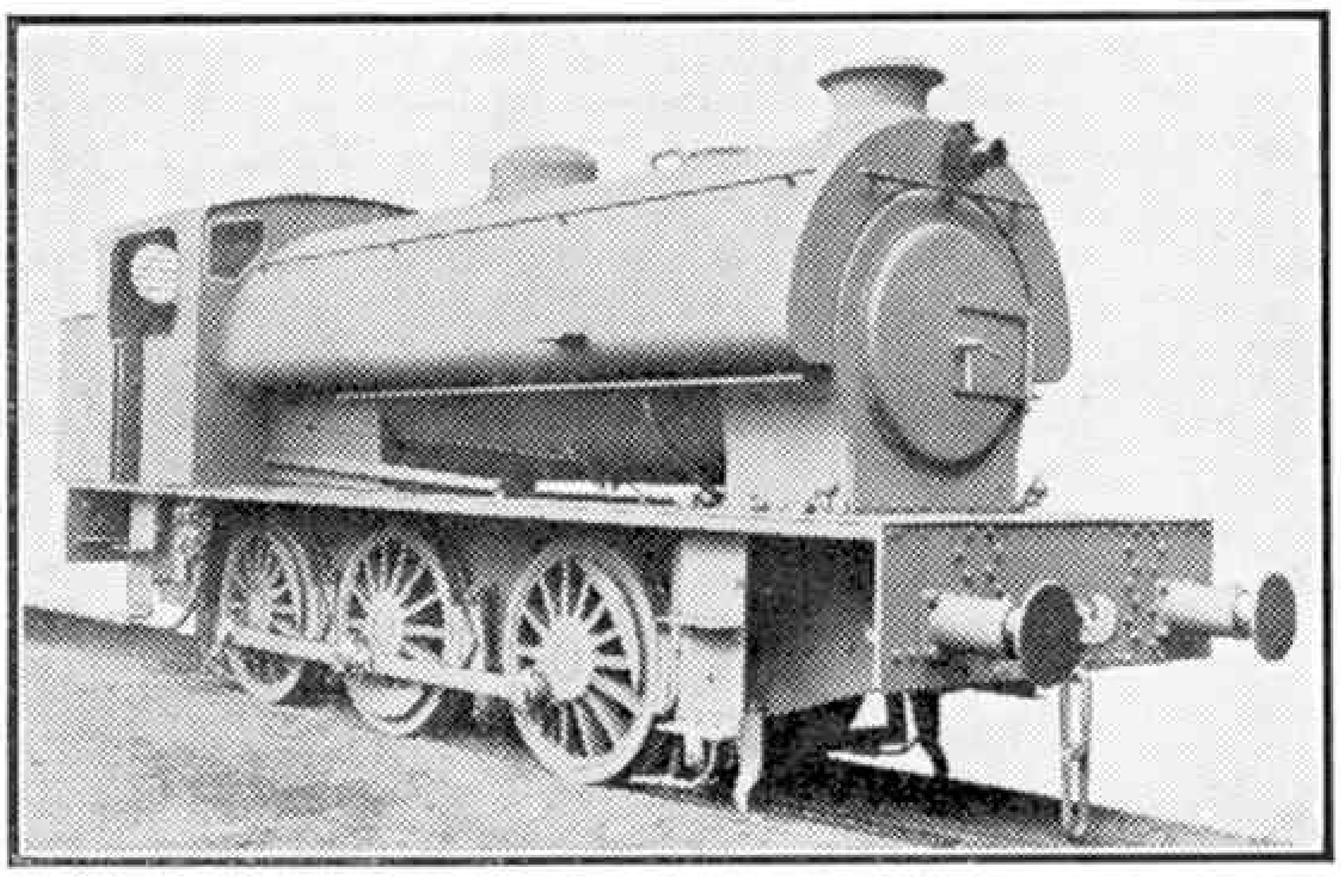
The parallel boiler barrel is constructed in two rings with inside (and outside) butt straps, all rivet holes being drilled, and steel rivets closed by hydraulic pressure. The fire-box casing is round topped, with a vertical backplate. The inner fire-box is made of copper and provides a grate area of 16.8 sq. ft. Steel boiler tubes are fitted, and clear waterways are provided, with numerous washout openings to enable the boilers to be kept clean under bad feed water conditions. Normal pattern cast iron firebars are fitted.

The fire-box heating surface is 87½ sq. ft. and that of the tubes is 872½ sq. ft., giving a total of 960 sq. ft. The boiler pressure is 170 lb. per sq. in. The tractive effort at 85 per cent. of the boiler pressure is 23,870 lb. The weight of the engine in working order is 48 tons 4 cwt. The coal bunker holds 2¼ tons, and the water capacity is 1,200 gal.

Simplicity of maintenance and operation has influenced the selection of all fittings. The boiler is fed by two hot-water injectors, and the two safety valves are of the Ross pop type. Steam sanding is fitted and there are steam and hand brakes that can work together or independently on all wheels. The steam brake valve is arranged for operation from either side of the cab, as is the regulator.

The cab is roomy and is fitted with hinged windows front and back. It has ample side openings and a ventilator in the roof. The upper part of the cab is easily removed.

Welded construction has been widely used throughout the construction of these engines, for large and small units, including saddle tank, cab, coal bunker, ashpan and sand boxes.



Another view of the new engine. It is capable of shunting trains of 1,000 tons.

At a Modern Aircraft Factory

By C. G. Grey

Founder of "The Aeroplane" 1911, Editor until September, 1939

AN aircraft factory to-day is not a bit like our aircraft factories were 10 or 15 years ago, except that most of them are on the edge of an aerodrome somewhere so that the aircraft which they produce can be flown away. Even then some of them are a good way from their aerodromes, so that the complete aircraft have to be towed along a road to get to the place from which they can fly.

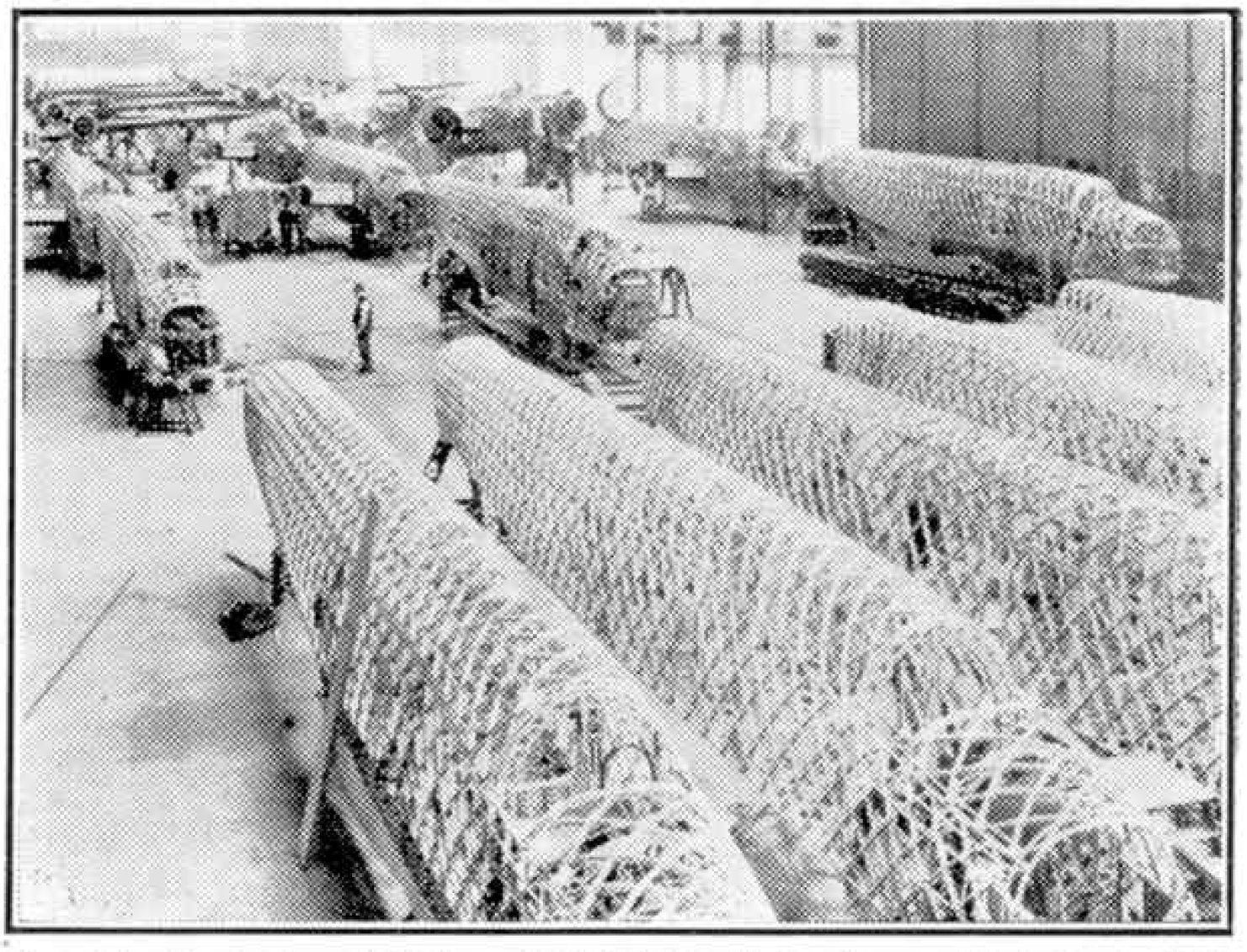
In the days between wars, when an order for 20 aeroplanes of one kind was quite handsome, and an order for 200 aeroplanes was a year's work for one of the busiest factories, the great idea was to make everything in the one factory, so that the works manager and the designers and the directors could take a walk round and see for themselves how any particular part was being made, whether it was the joy-stick which controlled the machine, or the whole fuselage, or the tail-wheel or anything else. Very few complete parts were made outside the factory. Naturally all electric fittings were made by electrical firms, and navigating instruments and so forth were made outside, but even they were generally fitted into the instrument-panel, which is placed in front of the pilot, in the factory itself.

Also most of the between-wars factories were rather higgledy-piggledy. Some of them had in fact grown up from the factories which had been built at the beginning of the last war in 1914 or 1915, and bits had been added to them all over the place. And some firms which had built huge factories during the last war had let some of their buildings to motor-car firms or manufacturers of quite different goods, so that when orders for aircraft began to increase, from 1930 onwards, they had to keep sticking bits on to their old factories. So one had the inconvenience of people carrying finished parts from one shop through another shop to the place where they would all be assembled.

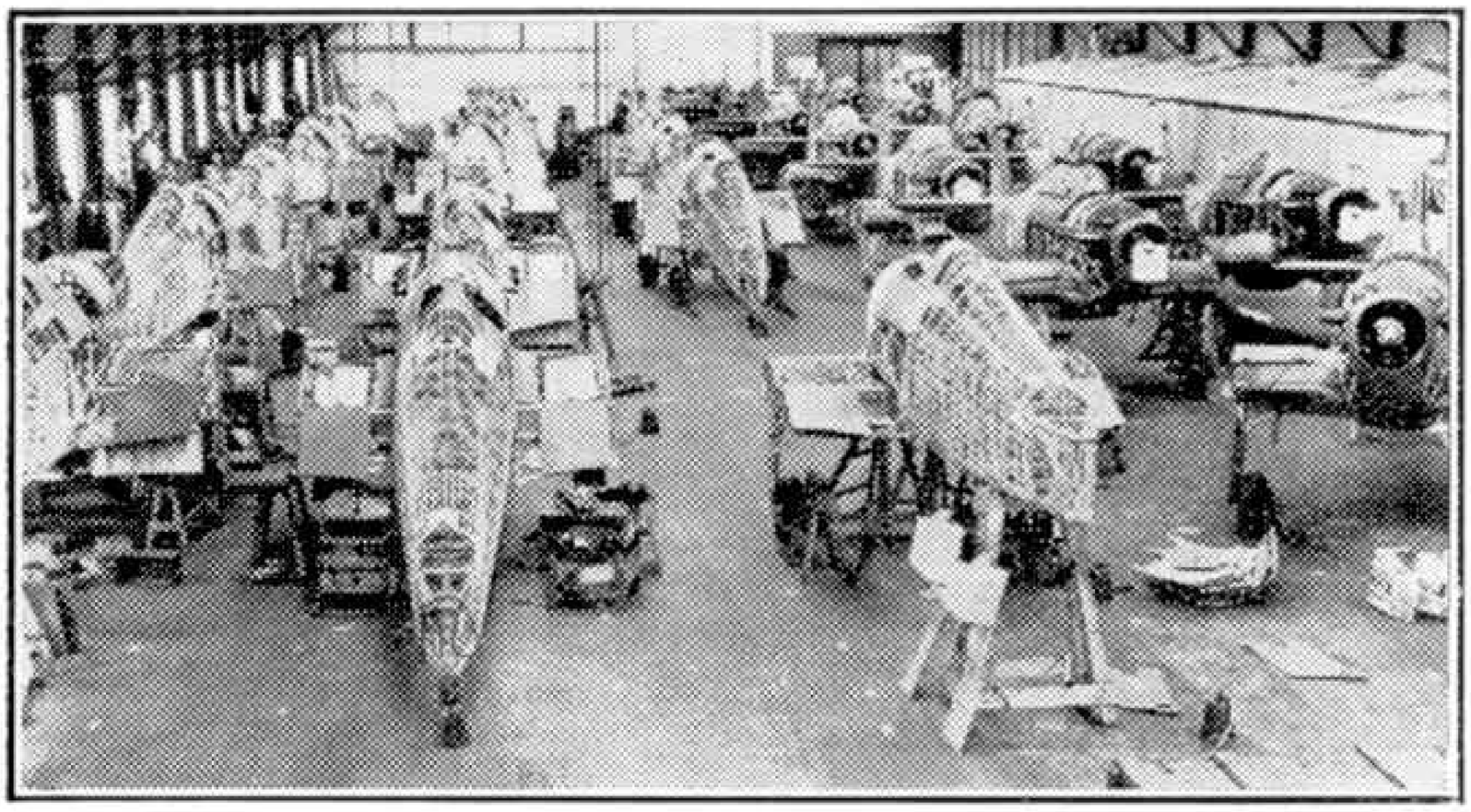
The result is that even to-day some of our biggest factories which make some of our biggest aircraft are like a maze to anybody who does not know his way about, and that in spite of the fact that the actual production of the bits and pieces of aircraft is organised on the most modern system.

The great idea in organising a modern aircraft factory is to arrange things so that if a bomb falls anywhere in the factory it is not going to stop the factory's output. One cannot absolutely guard against that, because no matter how the production of the different parts may be organised, they all have to come together in one particular shop to be assembled and pushed out as complete machines on to the aerodrome for the test pilots to fly. But even then the factory can be so arranged that, instead of having one big shed to which all the parts go, and out of which all the complete machines come, they have several sheds so that if one shed should be knocked out the others can still carry on.

I know one firm which has a very big



Geodetic fuselages of Vickers "Wellington" bombers. Photograph "The Aeroplane" Copyright.



Hawker "Hurricanes" in the making. Photograph "The Aeroplane" Copyright.

aerodrome and assembly sheds all round it each several hundred yards from the next, so that one bomb can hardly damage two sheds, and no bomber can get two sheds in a straight line with one another to drop a stick of bombs across two of them.

Not until 1936 did the Air Ministry wake up to the idea that if we had a war with some country which had a decent Air Force the output of any one of our best aeroplanes could be stopped by one bomb in the right place in the factory. And even after that, although some of the biggest steel manufacturers in Sheffield kept on saying it year after year at public dinners, the Government did not grasp the idea that a really heavy raid on certain streets in Sheffield would stop the whole of our steel supply, and there would be an end to aeroplanes, guns, tanks and everything else.

In 1936 the Air Ministry suddenly came out with what became known as the Shadow Factory Scheme. The idea was that each of some of our most important aircraft factories should have a shadow of itself built in some other part of the country, so that if the original factory were hit the other one could carry on. And as a general rule the shadows are much bigger than the original factories, and very much better organised and laid out.

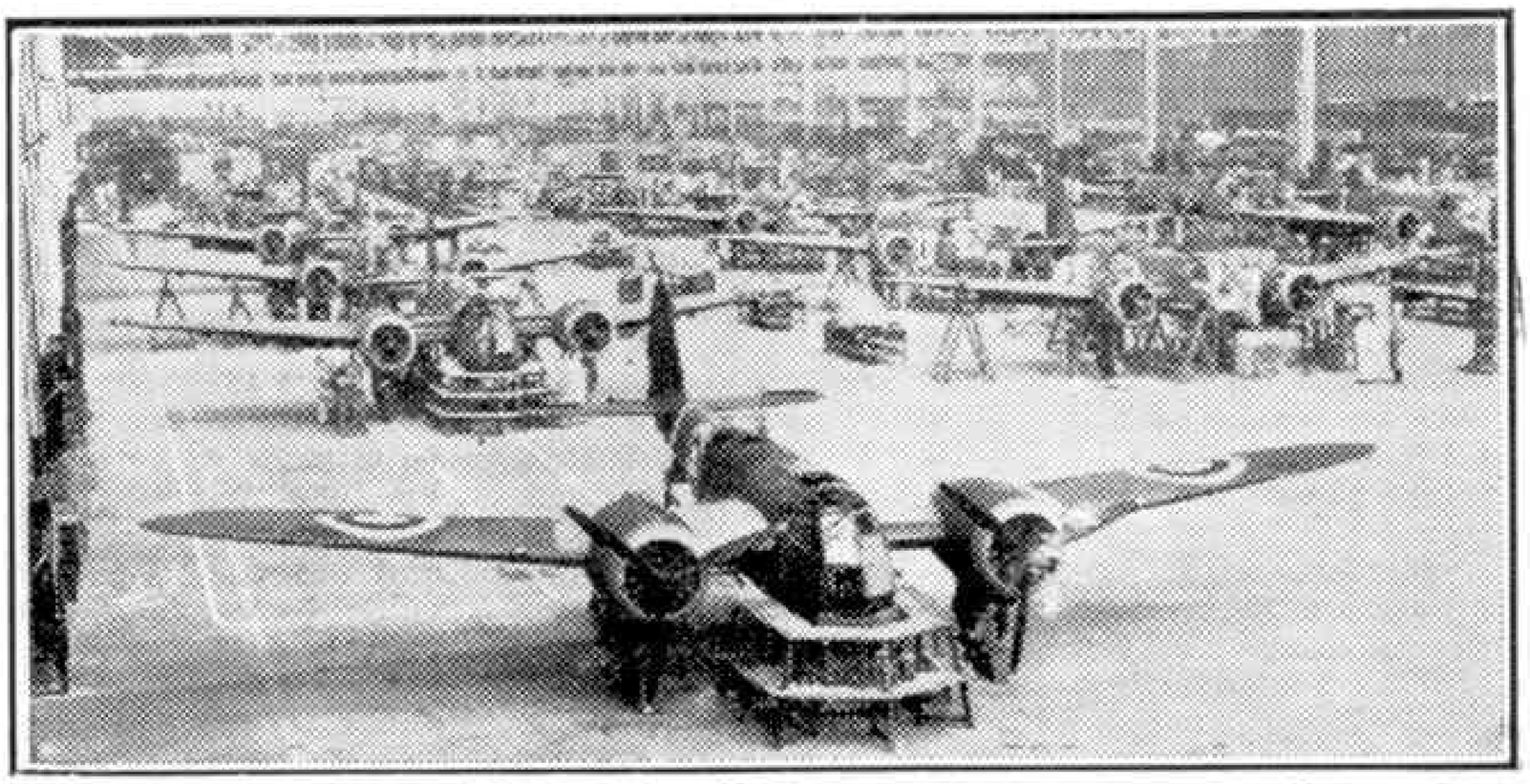
Raw material goes in at one end of the factory and is made up into various component parts, these are put together into what are called sub-assemblies; and these, at the finish, come into the assembly-shop where they are built into the complete aeroplane.

But even that scheme has the disadvantage that if an enemy bomb hits the right place it stops the output of the factory. A bomb in the part where they assemble the tail-planes would mean no more tail-planes possibly for weeks; and smashing the department where the tail-wheels are made would stop the whole output.

But after a bit of bother we learned better, and so, although shadow factories still exist and have increased and multiplied in numbers, practically all factories have changed over to what is called the Dispersal System. Everybody in these days knows what dispersal points are at an aerodrome, where the aeroplanes which are ready for operations, or sorties as the R.A.F. now call them, are dispersed all round what the R.A.F. calls the perimeter of the aerodrome. Why they cannot call it the boundary I do not know.

Well, the same idea has been brought into the Aircraft Industry on a much bigger scale. The result is that hardly anything is actually made in an aircraft factory. Almost all the parts are made outside and brought to the main factory. And some of the parts are made by the oddest people.

I was at one of our biggest and brightest aircraft factories not long ago, and all the time trucks were coming in from all

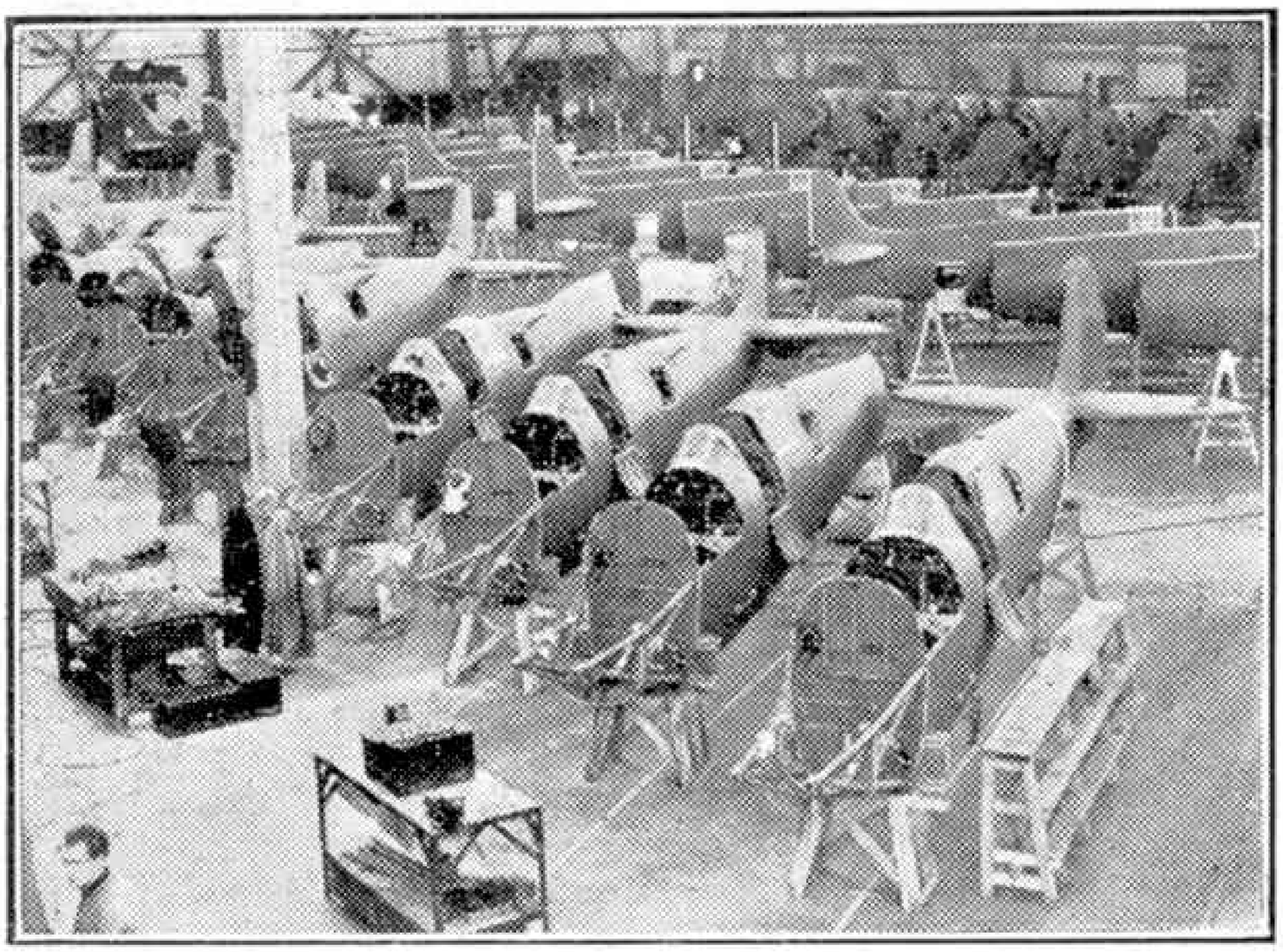


Impressive line of Bristol "Blenheims." Photograph "The Aeroplane" Copyright.

over the surrounding country with different bits and pieces of the aeroplane and all sorts of fittings from firms which were not aircraft firms at all. One truck was loaded up with things that looked like rabbit-runs, or something of that sort, gone wrong. These turned out to be the wooden fairings which fit on the top of the fuselage from the back of the cockpit to the beginning of the tail-plane. They are put in place and then fabric is doped over them. They are made by a furniture factory, a few miles from the aircraft factory, which has been taken over bodily by the aircraft firm.

Then another truck came in loaded with petrol tanks and oil tanks and such, from what had been a hardware firm, or, in the language of the Aircraft Industry, a firm of tin-bashers. The fact that tanks in these days are made of duralumin does not make them any the less a tin-basher's job.

Then from another firm came a whole lot of odd-looking things which turned out to be the troughs in which guns fit, and the curious-shaped boxes which carry the ammunition.



Vickers Supermarine "Spitfires": fuselages in the assembly shop. Photograph "The Aeroplane" Copyright.

The making of under-carriages, since retractable under-carriages came into use, has become a trade all to itself. No aircraft firm thinks of making its own under-carriages, and the under-carriage firms themselves have dispersed the production of all their bits and pieces.

Then there are all those complicated and frightfully cleverly designed hydraulic rams which work the under-carriages and the flap-gears and various other things which are stuck out and retracted. They are all made by special factories. And practically every factory has one or more shadow factories, so that if one workshop is hit the others can carry on.

Even the transport of bits and pieces inside the factories is so different from what it was in the old days. Men then pushed things around on hand-carts or carried them around in bundles. Now they are taken about either on electrically-driven or motor trollies or trucks or flat-cars, whichever you like to call them—the sort of thing that is used for taking luggage about at the big railway stations. And they are nearly all driven by girls, who stand on a tiny platform right up in the front and steer the thing with a tiller. It is a good idea, because if the driver is careless and runs into anything he or she is hit.

While I was at the door of one of the shops a couple of these flat cars came along loaded up with stuff which was off-loaded into the shop by a gang of boys under military age. Then the engine of the leading truck refused to start, and the girl driving the second truck settled the argument by driving into the back of the leading truck and pushing it till the engine picked up. These girls are getting frightfully mechanically minded. And they are very keen on their jobs.

The Works Manager told me that a day or two before, going through the assembly-shop, he had heard what sounded like the beginning of a war starting inside the fuselage of a big machine. When he drew near he found that one of the girl workers with an electric hand riveter was abusing a man who was working in the same machine for being so slow over his job, because she could not get on with hers till he got out of the way. Seeing that the lady was armed with a drill, and judging by the things she told the man about himself and his habits and all his family, the Manager went away, because he thought she was well able to look after herself and could tick the man off better than he could.

The assembly-lines in a modern factory are a pretty job. The way a naked fuselage grows as it progresses is just like watching flowers coming out in the spring. The order of assembly varies in different factories, but one starts the bare fuselage, then it may acquire a complete tail-unit which has been assembled, possibly in another shop, but equally possibly in another factory some miles away. Similarly the wings may have been built in another factory or another shop. And the under-carriage, which is practically always built somewhere else, is one of the first things fitted, because on it the fuselage travels down the line, as a rule. Some firms put their engines in after the wings are on, some put them in quite early in the process.

And, incidentally, when I wrote of the bare fuselage I did not mean that the inside was empty. I only meant bare outside. All the complicated electric wiring is fitted inside and the pilot's office is completely fitted, and in a big machine all the fittings for the crew are in place, when the fuselage comes into the assembly-shop.

The Handley-Page "Hampden" was I think the first machine the fuselage of which was built in two halves like a split lobster. All its electrical fittings and all the wiring, which is most difficult to handle when the machine has been put together, were fitted into the two halves and then the machine was joined up by interlocking pieces along the top and bottom. That cannot be done so easily with some of these huge big bombers, but on the other hand there is more room to move about inside and fix things. But even then all the electric leads which go from the office in front where the control-switches are, are generally made up in one great mass which is just laid along inside the fuselage and fixed at intervals, like a multiple cable.

Outside the factory is nearly as busy as inside. The modern aeroplane, unlike those of the last war, does not mind sitting out in the wet. Most of them are all-metal, and those which have fabric coverings to fairings or control surfaces, are so well protected by dope that weather does not affect them. As soon as they are clear of the assembly-shop out they go and out they stop, unless something is found to be really so wrong that the machine has to be brought back into the shop to have a big job done on it.

Every big firm in these days has quite a considerable staff of test pilots, generally R.A.F. pilots who have been put off flying for a bit. But there are also quite a number who (*Continued on page 178*)

Engineering News

Tyne Tunnel Scheme Revived

The scheme for tunnelling under the Tyne between North Shields and South Shields has again been revived. At present the river can be crossed below Newcastle only by ferry, and the need for a tunnel has been felt for many years. The present proposal is to construct a railway tunnel, through which a light railway on the Kearney principle would be constructed. A Kearney tube railway has only a single rail, on which the coaches are kept upright by means of an overhead guide rail. The great advantages of the system are that rapid acceleration is possible, and steep gradients can readily be climbed. The Kearney tube in fact was designed to allow stations to be built near the surface, with intermediate lengths of track dipping steeply to lower levels, so that trains could take full advantage of downward gradients to work up speed.

The steepest slope on the proposed Kearney tube railway under the Tyne would be 1 in 7. In South Shields the terminal station would be on the surface, and the L.N.E.R. have already made provision for platform interchange there. In North Shields the tube would end at a point 13 ft. below the level of the L.N.E.R. station, and at its greatest depth the tube would be 80 ft. below low water in the Tyne and 41 ft. below the lowest point of the bed of the river. Trains running into the tube would be considerably helped by gravity, and this would also provide a retarding force on approaching the stop. The total journey would be one of ¾ m., and under the middle of the river trains would travel at 60 m.p.h.

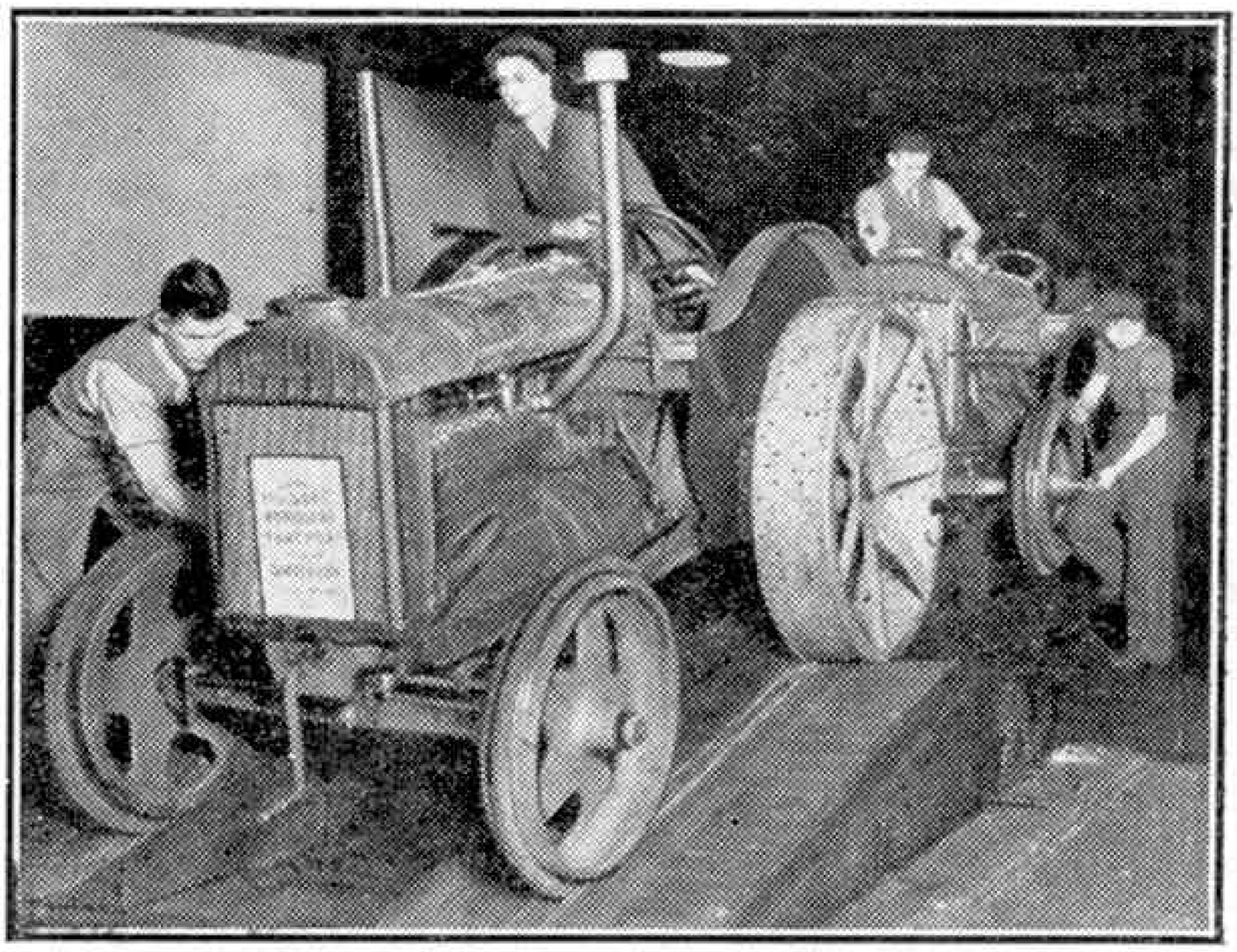
Motor Lorries with Two Engines

A patent has been taken out in the United States for a motor vehicle with two engines. The idea is to enable engine power to be suited to the load, so that a constant speed can be kept up in all road conditions, and to run the engines themselves at or near their highest efficiency. As an example of this system the normal engine of a six-wheeled lorry drives the leading pair of rear wheels, while a second engine behind the driver's cab drives the second pair. The cooling systems of the two engines are interconnected, so that the second engine will start easily when it is necessary to switch on. The control arrangements are complicated, since with both engines in operation it is necessary to ensure that both work in the same gear and that the clutches shall act at the same instant.

The Road Engineer Invades Iran

One of the interesting results of the war is the invasion of Iran, or Persia, by the road engineer. Existing roads had to be widened and re-surfaced, and generally improved, and many new roads also had to be built when it became necessary to carry supplies through the country to Russia. The new roads were made along the lines of crude pathways, some of which in places ran at dizzy heights over mountain ranges. Modern road-making machinery was introduced, but this could only be used in the more easily reached sections, and in the mountain districts native labour was brought into service. Often it was necessary to blast out sites on the sides of mountains and to build long retaining walls, and many bridges too had to be constructed in order to provide roads of suitable strength and width.

The general idea of the roads is to provide easy communication between the Persian Gulf ports and the area about the Caspian sea, a distance of about 650 miles, and to-day American-built lorries run swiftly over roads that either did not previously exist, or were mere trails on which only camels and donkeys were to be seen.



The 150,000th Fordson tractor coming off the assembly line at Ford Works, Dagenham, on 29th March last. There are over 120,000 tractors in use on British farms at the present time, and they are playing a vital part in increasing Britain's supplies of home-grown foods. Photograph by courtesy of the Ford Motor Co. Ltd.

Conveyor Belt Used in Dam Construction

A large earth dam is being built outside Pittsburgh, in the United States, in order to protect the city from floods. The earth is being placed in position by means of a belt conveyor, and the dam is believed to be the first constructed in this manner. The belt is 3 ft. 6 in. wide, and forms part of a great conveyor system that transports material from the crushing plant to one end of the dam, where it is distributed by means of scrapers. It was found that the use of the conveyor reduced the cost of the work and speeded it up, while it also provides a better mixing of the crushed rock and filling material employed.

New Treatment for Porous Castings

In the past metal castings, including those of light metals as well as iron and steel, had to be returned to the melting pot if they proved porous. Now a large proportion of these can be made serviceable by filling in the pores with Bakelite, which is insoluble in water, petrol, and oil, and resists the action of steam.

The Bakelite is introduced in the form of a solution that is pumped into the interior of the casting under pressure varying from 50 to 600 lb. per sq. in., according to requirements. The castings are then heated in an oven at a constant temperature below 100 deg. C. until the solvents have evaporated, after which the temperature can be raised to complete the heat treatment necessary.

Railway News

Locomotive Variety

Recently a remarkable "convoy" of locomotives was seen in a North West district. The engines were making their way to their respective depots after release from their trains. Coupled together, in order, were five engines. The first was an L.M.S. Fowler 0–6–0; then followed an "Austin Seven" or 0–8–0 of class 7F, two ex-L.N.W.R. 0–8–0s and finally a G.W.R. 4–6–0, "*Derwent Grange.*" At the same time, in addition to various standard classes of both L.M.S. and G.W.R., former "Lanky" and Midland engines were on view; a particularly ponderous "stranger" to the district was one of the giant Horwich 0–8–0s with eight-wheeled tender.

To complete the variety there were two Baldwin-built "Austerity" 2–8–0s in the shed nearby, their typical North American contours contrasting remarkably with their Swindon "cousins" on adjacent tracks. L.C.N.

Some West Country Notes

A fair number of G.W.R. locomotives are now running painted black; green, without lining out, is reserved for "Kings" and "Castles," but the various gradations of brass and copper work are retained. Some variety in lettering has arisen, apparently through the stocks of the standard monogram transfers running out. The former coat of arms has reappeared on some tenders, flanked by bold lettering "*G.W.*"; others have lettering "*G.W.R.*" only, probably due to the desire to use available material. A further variation is seen on "*Albert Hall*"; although now black, the monogram is carried.

Wartime loads are necessitating a good deal of piloting in certain places, and in one district some remarkable combinations of locomotive classes are sometimes seen. If the pilot is a tank engine, such as a 61xx or 51xx 2–6–2T, it may be running bunker first, and on one occasion at least an up train of empty stock had not only the pilot bunker first but also the train engine, a "Hall," with the tender leading. Tank engines, veteran "Bulldog" 4–4–0s and even modern "Castles," "Halls," "Granges" and so on appear as pilots, while one interesting sight was that of No. 2971 "*Albion*," one of the earliest Swindon 2-cylinder 4–6–0s, piloting a "Castle."

R. P. WALFORD.

Banking with Four Engines on the Lickey Incline

For 23 years L.M.S. banking engine No. 2290, the only 0–10–0 superheated "Decapod" locomotive in Britain, has assisted passenger and freight trains up the three-mile Lickey Incline in the manner described in the "*M.M.*" for August of last year. So great and heavy is present day traffic, however, that three other banking engines now have to join couplings with "Big Emma," as this famous locomotive is called, to get the war freights up the steepest of main line inclines in Gt. Britain.

In the days of peace No. 2290's biggest clients on this 1 in 37 gradient between Bromsgrove and Blackwell stations were fast expresses and light freighters from Bristol to Birmingham and the north, but now "Big Emma" and three assistants have to unite their strength to storm the incline with 650-ton trains of munitions, steel and coal, pushing trains up the Lickey at the rate of two an hour.

When one track is under repair trains have to proceed, under special rules, on the wrong road. Our photograph shows an L.M.S. Scottish express in these circumstances. Photograph by W. S. Garth, Luton.

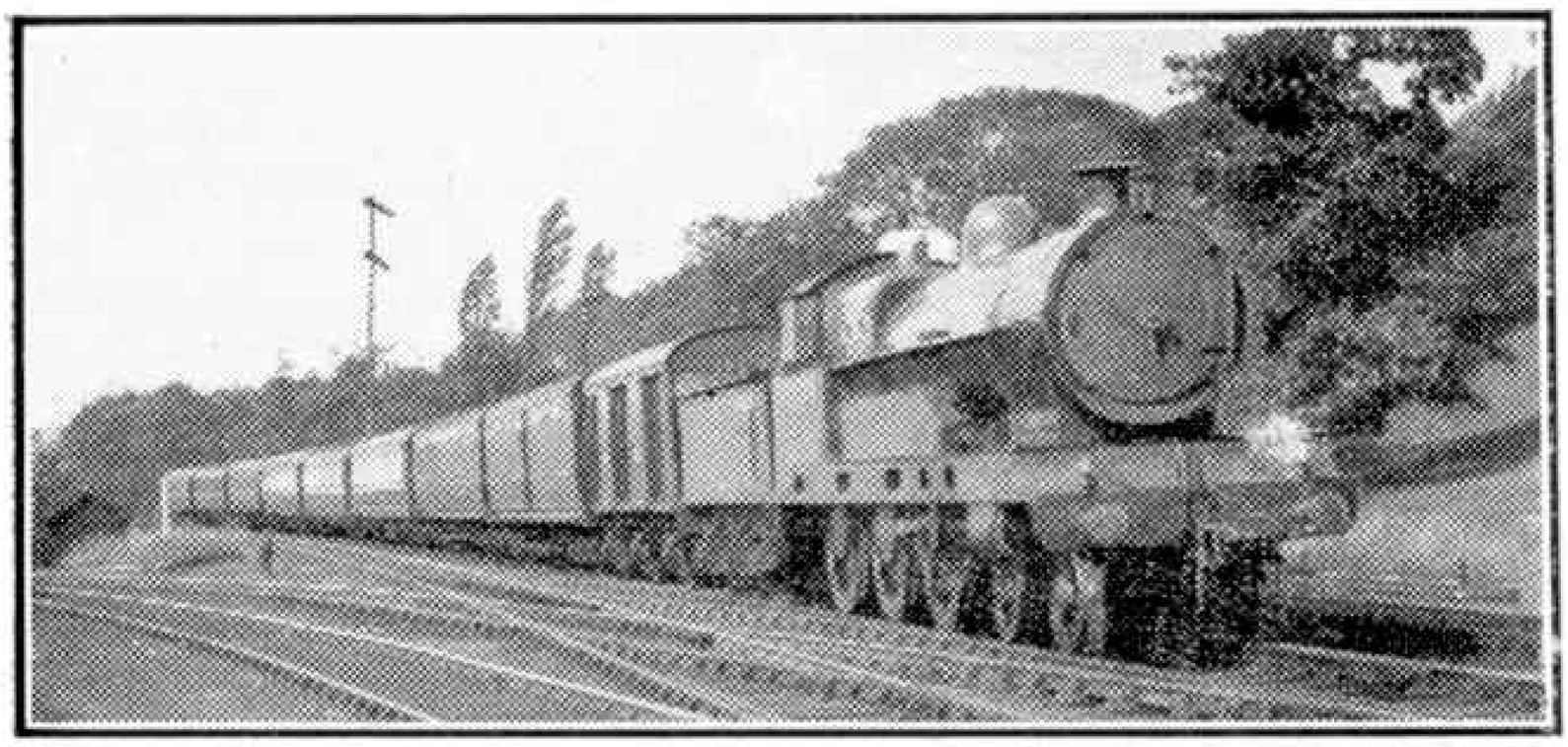
L.M.S. Locomotive Performance

Fine running has been recorded on a number of recent occasions by Stanier "Pacifics" hauling heavy trains over the mountainous Carnforth-Carlisle section of the West Coast main line. As much as 17 to 20 min. has been recovered on through runs from Crewe, so that the actual net times were fully equal to the fastest peacetime bookings intended for lighter average loads.

A southbound journey logged by Mr. O. S. Nock behind No. 6243 "*City of Lancaster*," one of the latest 4–6–2s, hauling 470 tons, began badly, a dead stand for signals occurring soon after leaving Carlisle. Up the steepening rise towards Penrith the speed attained was 47½ m.p.h., dropping back to 44 and then rising to 57 on the Penrith level. The main ascent to Shap in this direction is not as steep as the final climb on the northbound route, though nearly 10 miles at 1 in 125 present a stiff proposition to heavy trains. On this occasion an average of almost 40 m.p.h. was maintained, with a minimum of 37, and the summit, which is on a short level tableland, was passed at 43. Matters were taken easily down most of the long subsequent descent, but 69 was twice touched before Oxenholme and the timing of this particular train, the 8.34 p.m. from Carlisle, was considerably improved upon.

No. 5467 of the general service class "5P5F" 2-cyl. 6 ft. 4–6–0 mixed traffic class, on a 16-coach night express weighing about 515 tons and running late, took matters gently over the steepest grades, though always appearing to have plenty of steam and recovering well from signal checks on Shap ascent. The net time for the 90 miles Carlisle-Preston was 2 min. more than scheduled, but so enterprising was the running over the next 51-mile stage to Crewe that no less than 16 min. were recovered; the timing allows a margin of which good advantage was taken.

Two runs behind locomotives of the same type recorded by Mr. Nock over the Crewe-Shrewsbury section of the joint north to west route, where bookings are still fast for the hard road and the loads hauled, proved that lively running is still forthcoming, as on the stages further south worked by G.W.



West Coast express hauled by an original "Claughton," L.N.W.R. Photograph by H. Gordon Tidey.

engines. With 465 tons No. 5256 suffered signal and p.w. slacks in the first easy 5 miles to Nantwich, which hampered the 7-mile climb before Whitchurch stop, on which speed fell finally to 27 m.p.h. up 1 in 107. On to Shrewsbury the 18½ miles along an undulating road were covered in 24 min., allowing for a signal delay, with speed ranging from 53 to 62 m.p.h. In the opposite direction No. 5399 with a heavier 490-ton train attained 25 m.p.h. up the 1 in 117 from Shrewsbury start, and then kept approximate time non-stop to the outskirts of Crewe, where a hold-up was encountered on account of busy traffic. Up Whitchurch bank the minimum of 48½ was succeeded by a downhill maximum of 70½ m.p.h.

One of the 3-cyl. 4–6–0 express engines of the "Patriot" class, built by the L.M.S. to the same dimensions as those rebuilt from "Claughtons," not long ago gained 11 min. with a 380-ton train between Bletchley and Crewe, although stops had to be made at Rugby, Nuneaton and Stafford. The 36½ miles between the two last named towns occupied only 37 min. start to stop; there was some lively 70 m.p.h. travelling along the Trent valley, with little assistance from gravity, reminiscent of a Manchester express run in pre-war days behind a similar locomotive.

Millions of Tickets for Munitions

Eight hundred million railway tickets collected last year, weighing 602 tons, have been sent to the mills for repulping. Those not used again as fresh cardboard will be turned into A.A. shell containers; for instance 122 tons of pulped tickets will make 12,000 4.5 in. shell cases. Ticket collectors' clippings are also salvaged and many hundredweights of these small sections of card have gone to help the war effort.

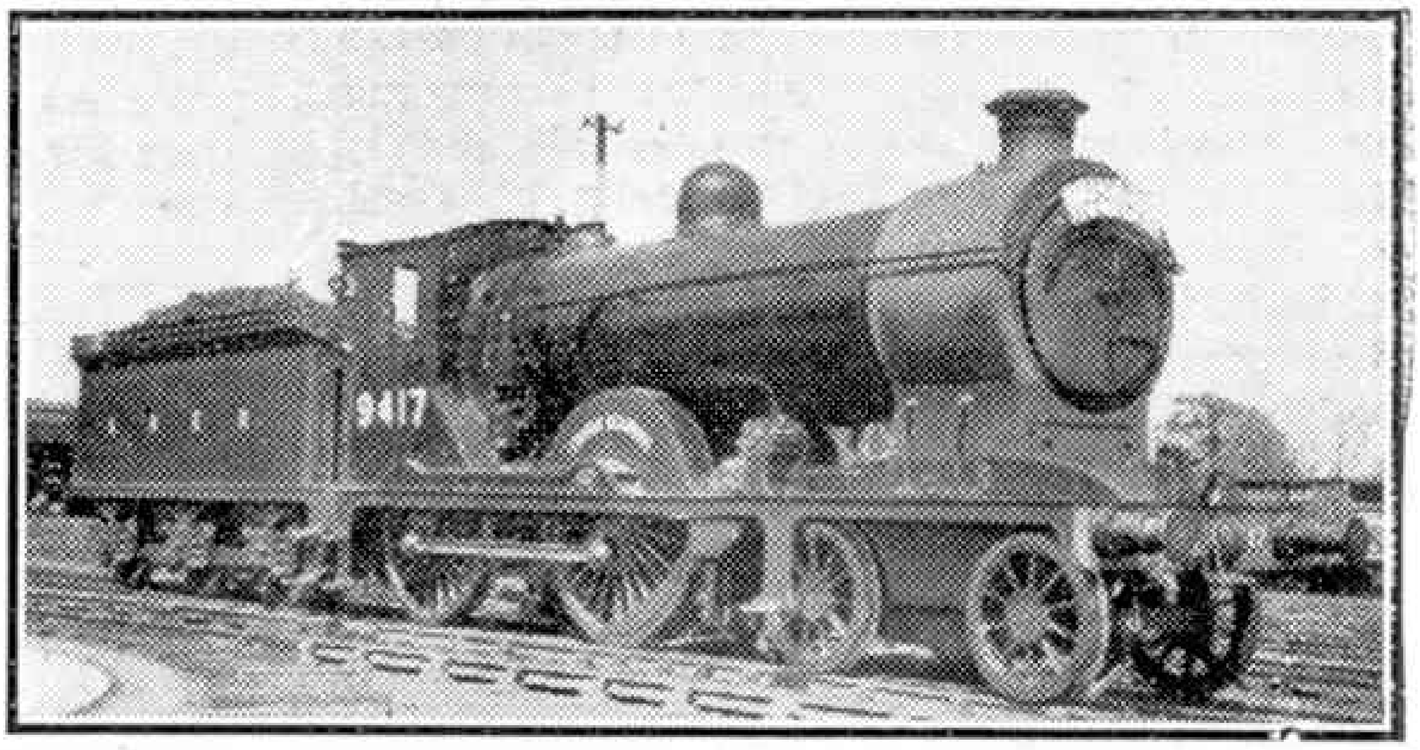
Edinburgh-Glasgow Expresses in 4-4-0 Days

The L.N.E.R. route between the two largest Scottish cities is remarkably easily graded with the exception of the tremendous rise out of Glasgow (Queen St.) towards Cowlairs. Up this 1 in 42 banking assistance is invariably provided. For many years a feature of the timetables has been a series of expresses making this 47¼-mile journey in about an hour with one or two stops.

Mr. R. A. H. Weight recalls some journeys on these in the days when brown 4–4–0 engines usually provided the motive power. "*Cuddie Headrigg*" of the former North British Railway larger superheated "Scott" class, now L.N.E.R. "D30," had to work a 290-ton train from Glasgow to Haymarket, Edinburgh, in 58 min. The 1¼ mile climb through tunnel and cutting to Cowlairs took 5¾ min.; after that the going was good considering the modest size of the locomotive and the weight of the train, Falkirk, 22 miles, being passed cautiously in 29½ min. There was a slowing to 32 m.p.h. in the tunnel, followed by a relaying slack before historic Linlithgow, but after speeds varying between 54 and 65 m.p.h. on almost level track the arrival at Haymarket was barely ½ min. late.

In the opposite direction N.B.R. "*Wandering Willie*" of the older "Scott" unsuperheated class, having smaller cylinders but higher boiler pressure than the "D30s," was hauling one corridor coach less on the 1 p.m. from Edinburgh, making the full load 255 tons. The engine is now L.N.E.R. No. 9499, class "D29/2" rebuilt with large superheater boiler. The run from Haymarket to Glasgow was made exactly in the 60 min. then allowed without exceeding 61 m.p.h., including slowings near Falkirk and a gentle descent to the cavernous depths of Queen Street. Within the hour spent on the trip, without any undue sign of hurry, a four-course lunch was served to a full complement of passengers, in one of those comfortable N.B. dining cars, which at that time were the heaviest in Britain, weighing 47 tons.

In more recent years loads on that route mounted considerably, though thanks to greatly increased locomotive power acceleration was easily possible. For instance, in 1934 "Shire" 3-cyl. 4–4–0s were making the Haymarket-Queen St. run with 300-330 tons in 54 min. or less, including several service slacks. The Scottish "Director" 4–4–0s often performed similarly.



L.N.E.R. No. 9417 "Cuddie Headrigg," of the larger "Scott" class of the former N.B.R., photographed when waiting to act as assisting engine to a Reid "Atlantic" north of Edinburgh. Photograph by John F. Rutherford.

* * * *

The longest tunnel on the Canadian National Railways is that under Mount Royal, Montreal; it is just over 3 miles in length. The second longest, 2 miles in length, is under the St. Clair river at Sarnia, Ontario.

Have You Ever Thought About This?

I.—Why are Gears Necessary?*

WHY are gears necessary? There are various reasons, so let us deal with them under their respective headings.

TRANSFER OF MOTION

Gears are a simple and positive means of transferring motion from one spindle to another. That is easy.

TRANSFER OF DIRECTION OF MOTION

To transfer motion from a spindle to another at right angles, or any other angle, is accomplished by bevel, worm or spiral gears.

Take a fairly obvious example. The engine of a car is "fore and aft," and the drive has to be transmitted to the rear axle, which is across the chassis. This means either bevel or worm gears. Elementary! So let us go a bit further.

REDUCTION OF SPEED

A pinion (the smaller gear) with 12 teeth, gears with a wheel (the larger gear) which has 24 teeth. The teeth mesh together; therefore, when the pinion has made a complete revolution all its 12 teeth have meshed. Obviously 12 teeth of the wheel have also engaged, and, as this is half the number of wheel teeth, the wheel has revolved half a turn. The ratio is therefore 2 to 1.

Within reasonable limits, almost any ratio can be achieved by variation of the numbers of teeth.

Every type of machine has its own economical speed, and most of them differ. Take a motor car, where a small engine runs efficiently at 3,000 revolutions per minute. Without gearing this would give a road speed of well over 200 miles per hour. A nice cruising speed until you come to a corner, and if you attempt to slow down the engine will "conk" out. It sounds silly, but it is the true answer.

Take another example. A common and efficient speed for an electric motor is 1,440 revolutions per minute, and a dough-mixing machine runs about 50 revolutions per minute. Imagine what would happen if the motor were direct-coupled and the mixer speeded up to nearly 30 times its speed. There would be dough splashed from Birmingham to Biggleswade, and the disintegrated machine would go with it!

We can now safely assume that gears for reducing speed are very necessary, so let us now take the opposite angle.

INCREASE OF SPEED

In many parts of the country water is pumped from bore holes, and the motive power is usually an oil engine whose speed, as compared with that of the pump, is stately and imposing. If the pump ran at this same speed, the water lifted would be merely a trickle. This means increasing gears, but don't think this is a new type of gear. It only means that, instead of the pinion driving the wheel, the wheel drives the pinion.

We seem to be sorting out some of the uses for gears so let us consider a different use.

INCREASE IN EFFORT

If you were asked to lift a hundredweight with one hand, you would either refuse or do it once for swank, but would not do it all day. Now if you were to lift it 1 lb. at a time you would find it monotonous, but it would be no more than many people do every day.

Compare this with an electric motor. If it were expected to lift a weight of 1 cwt. every revolution it would be an expensive, wasteful and costly machine. Now if, by the use of gears, it were allowed to run at a high speed and exert an effort equal to 1 lb. for each revolution, it would be a small, compact and efficient machine which would tick over merrily without any fuss.

***Reprinted, by courtesy of the Editor, from "Contact," the journal of David Brown and Sons (Hudd.) Ltd. and associated Companies.**

Photography

Lakes and Ponds

By A.R.P.S.

MOST of us live near parks or open spaces where there is a lake or pond that can be visited almost at any time, and so I have selected lakes as my subject for this month's talk.

There are many natural sheets of water which offer good opportunities for the picture hunter at any time of the year, but at this season those opportunities are perhaps better than at any other, for the reason that the tree foliage is not so heavy, and generally the lighting is softer.

It is a mistake to take a view with the camera facing across the lake, usually the result shows too much water. A better effect will result if you can find a satisfactory bend in the bank or side of the lake, and include a clump of trees or bushes with their reflections, while a portion of the lake occupies the remainder of the film. If there happens to be a small island or a pair of swans, search for a position where these can be included in the picture.

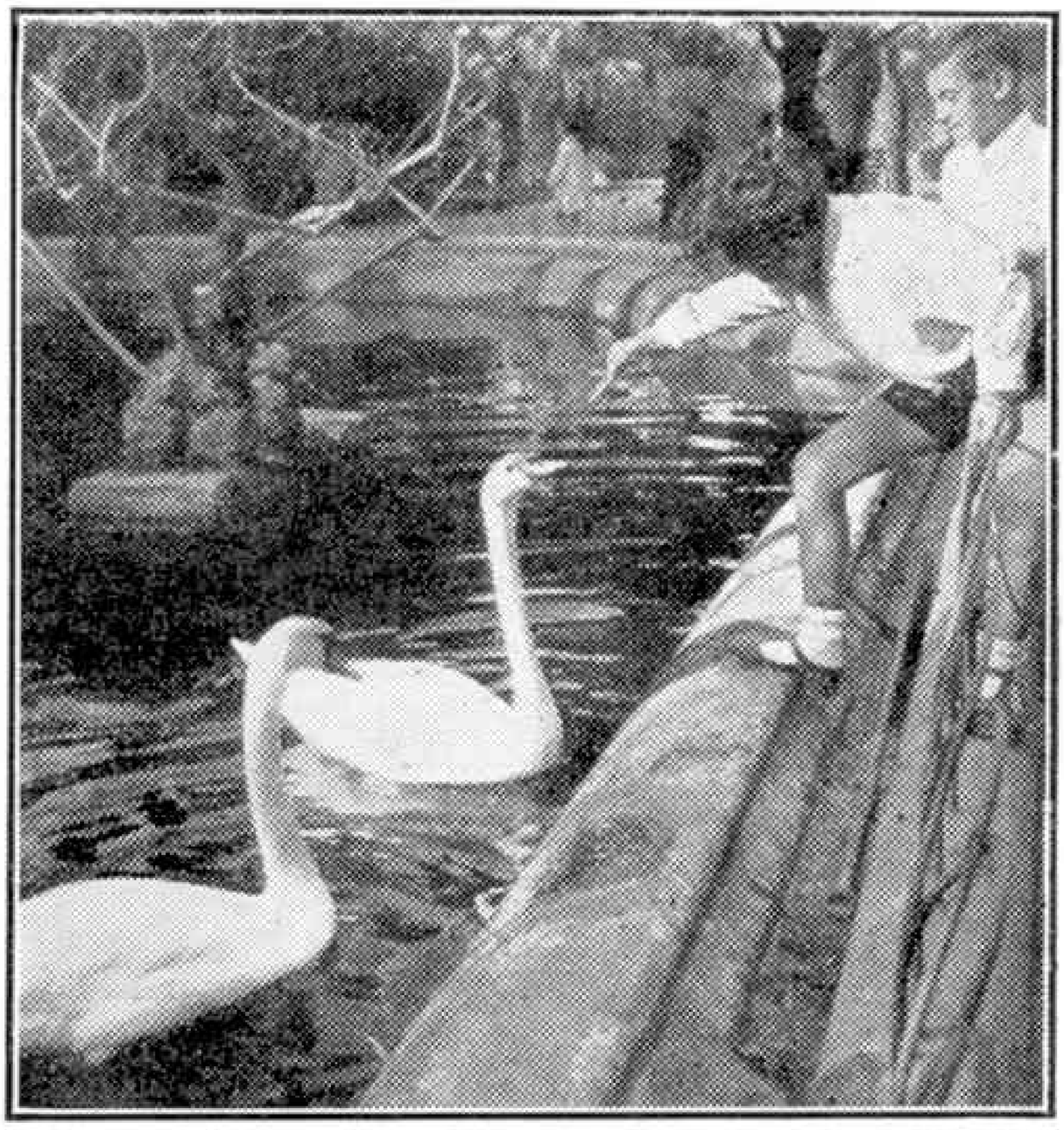
The inclusion of figures on the bank requires care. Figures will often spoil a picture by being too prominent. If you have two friends with you, and it is possible for one to be sitting and the other standing, you may get a good result, but do not attempt to expose with both standing.

Artificial lakes, those with built-up banks, do not lend themselves well for picture making, and so it is necessary to survey the scene in order to find a place where little of the bank will be included. Perhaps you will alight on a point where there is an overhanging tree obscuring the stone wall of the edge.

Artificial lakes are often used for model yacht racing, and many excellent "shots" can be obtained. The time to expose is a few seconds after the start, when all the models are away from the shore and under way. Watch them in your view-finder and be sure to wait until they have separated. It is possible to be in a position where you can get them in a very pleasing line all heeling over with the wind, making their sails look very pictorial. Avoid including the owners of the boats. For this subject you can allow a good stretch of water in the foreground because the centre of interest is the group of models.

Do not be too keen on a small stop. I would suggest F8, and with a Selo H.P.3 film give 1/200th or for F11, 1/100th. If you are taking racing models you will require a larger stop, say F6.8, and give 1/500th.

If you have not started developing by the time method, do so with your next film; I am certain you will be pleased with the results. It is the surest and most successful way.

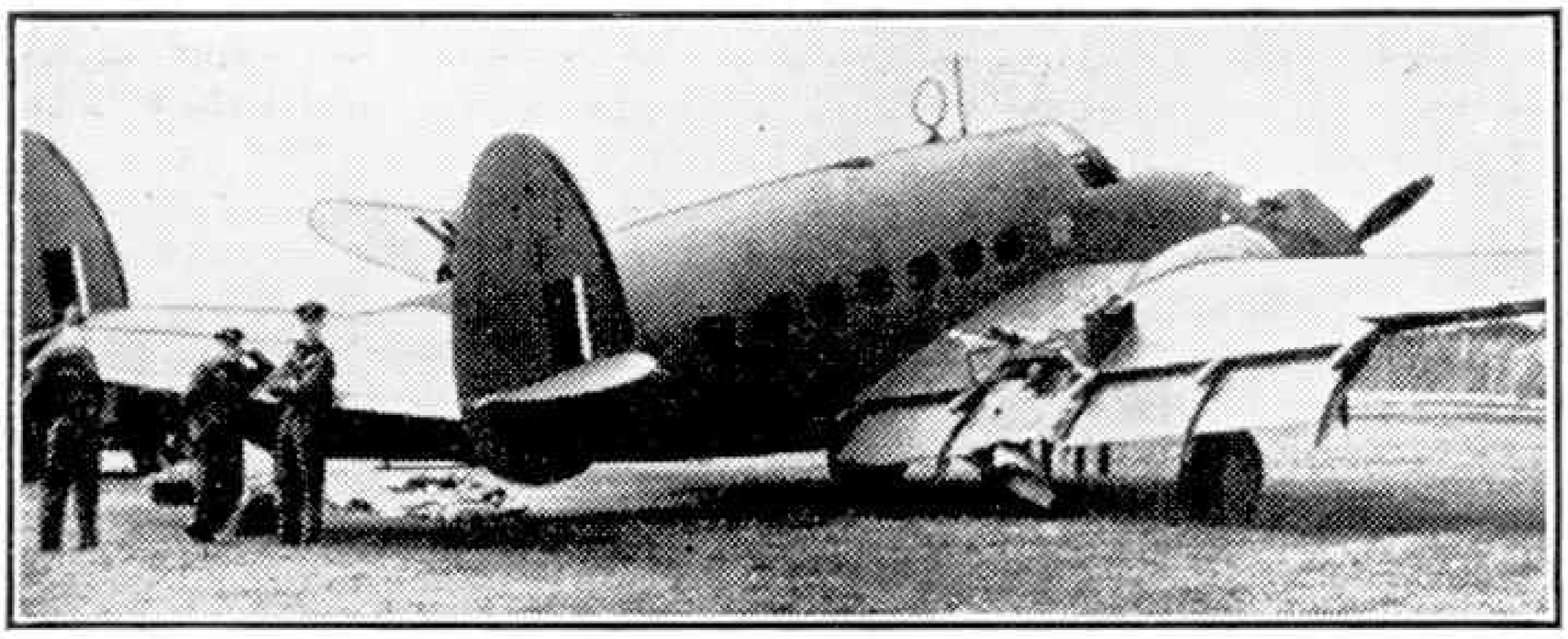


The Swan Pool. Photograph by J. Zammit, Valetta, Malta, G.C. The upper photograph is by G. F. Webb, Swindon, Wilts.

Air News

The "Hudson" Got Back Safely

Lockheed "Hudson" reconnaissance bombers were the first American military aircraft to go into service with the Royal Air Force, and as machines of Coastal Command they have flown millions of miles on reconnaissance and bombing sorties over the North Sea, Atlantic, and elsewhere. Often the machines return to base bearing scars denoting a "brush" with the enemy, and sometimes the fact that they have got back at all is a striking proof of their sturdy construction and ability to maintain flight under severe handicaps. The "Hudson" illustrated on this page returned to its base after attacking an enemy convoy creeping along the Dutch coast, and examination of the machine after landing revealed a hole in one wing large enough for three men to stand in together.



The shell-torn "Hudson" bomber back at its R.A.F. base (see story on this page). Photographs by courtesy of Lockheed Aircraft Corporation, U.S.A.

When the crew of the "Hudson" located the convoy the sky around became filled with hostile "flak." Immediately the bombs had been dropped the pilot took evasive action, and was weaving his way out of the enemy's fire when a medium-sized shell hit the machine. "I was just congratulating myself that we were clear of the 'flak' when the 'kite' seemed to jump about 20 yards in the air," related the pilot. "We had been hit in the starboard wing, near the trailing edge behind the engine. Luckily the engine was not touched, and continued ticking over perfectly. The starboard flap was blown out and the undercarriage tyre punctured, but otherwise there was no damage inside the fuselage and none of us was scratched."

It was the third time this crew had been shot up by A.A. fire while attacking enemy shipping, and the third time their "Hudson" had been badly damaged, limped home, and landed safely. "We're getting quite used to it now," remarked the pilot. "We don't worry any more. We know that if the enemy leaves us one engine and a few pieces of wing and fuselage, we can get the old 'kite' home safe."

* * * *

The Douglas C-54 military transport which had been named the "Airmaster," as mentioned in the March 1943 "*Air News*," has been renamed "Skymaster," possibly to avoid confusion with the Cessna "Airmaster." The "Skymaster" is developed from the Douglas DC-4A air liner and is in large scale production. Its four powerful engines give it a top speed of 264 m.p.h., and it has accommodation for about 50 men. The military transport version of the Douglas DC-3A air liner is called the "Skytrooper."

Post-War Air Service Pioneers

A group of pilots of Britain's Merchant Air Service, flying the giant landplanes of British Overseas Airways between the United States, Newfoundland, and Canada, have completed their second winter operating the North Atlantic Return Ferry. This is the only two-way service across the North Atlantic, and its main object is to take back to Canada those pilots who have "ferried" American and Canadian bombers to this country. Also carried in both directions are important passengers whose claim for a seat on the aircraft is that they are on duties vitally important to the war effort.

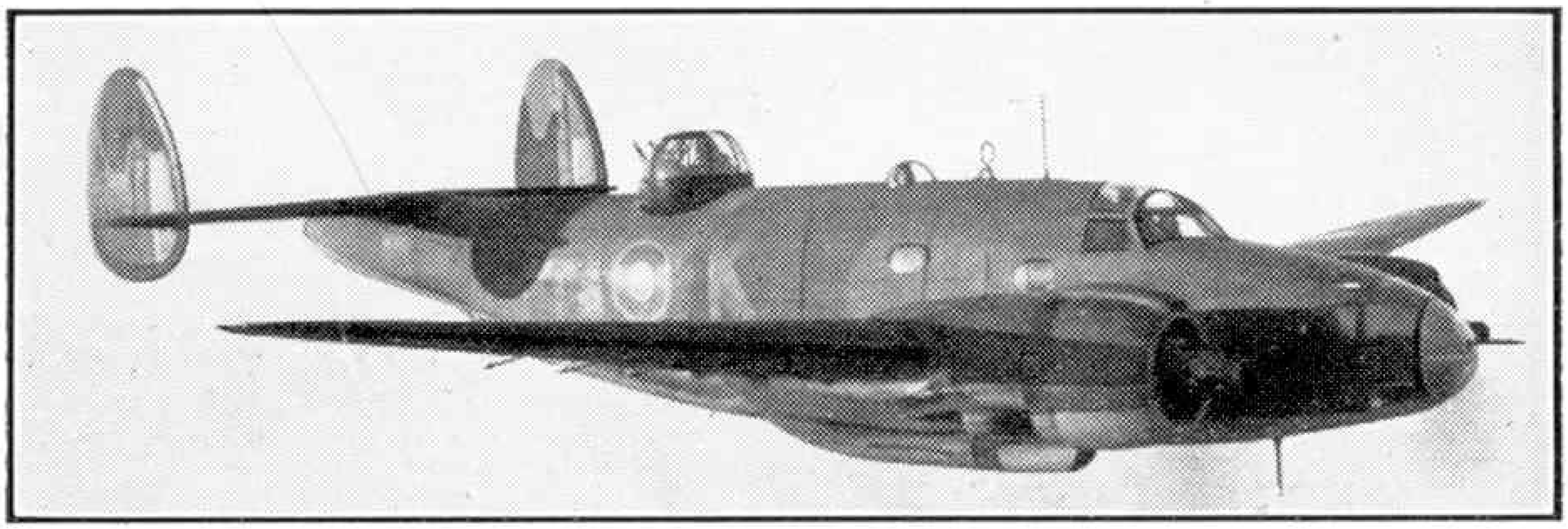
Several times weekly throughout the winter, flying at great height and often in a temperature 40 deg. below zero Centigrade, these captains and crews have crossed the North Atlantic in both directions with a regularity that compares favourably with that of the Continental services in peace-time. The two winters of pioneering done by these men of the Merchant Air Service prove that it will be possible, with suitable equipment, to open all the year round England-to-America services across the Atlantic with the high safety standards required for peace-time air line operation.

The pilots, who are pioneering in the full sense of the word, do not regard it as thrilling or romantic. Theirs is just a job of work, highly technical of course, but they do it without fuss, and reject any suggestion of glamour. Before the war these pilots were well known on the air routes between England and Continental cities—Paris, Brussels, Budapest, and Basle.

Demonstrating that the hole in the starboard wing is large enough to accommodate three men.

* * * *

Four times as many heavy bombers were produced in February this year as in the corresponding month of 1942, according to Mr. Oliver Lyttelton, Minister of Production.



This flying view of a Lockheed Vega "Ventura" bomber shows the upper mid-way gun turret and the wide twin-rudder tail. Photograph "The Aeroplane" Copyright.

Unusual Glider Landing

Towing a glider through the air is not as simple as it looks from the ground, nor does the glider pilot just sit idle. He has a tricky job, and the introduction of night glider flying has not made things easier.

One Wing Commander, of Army Co-operation Command, R.A.F., an authority on glider towing and flying by day and night, has had many interesting experiences. On one occasion a R.A.F. pilot was in the glider with him at night, getting the glider pilot's angle. They took off towed by an aircraft, and at 300 ft., when they were well away from the flarepath, the instructor said "Now if you look back you will see the lights." Unwittingly the pilot pulled the lever that unshackles the glider, and they found themselves free of the aircraft and without engines, lights, or means of knowing their direction. The Wing Commander took over at once, did as near a right-about-turn as he could guess in the pitch darkness, and the glider came in to land downwind. They scraped over the boundary hedge of the airfield without a foot to spare, and landed safely.

Italian Reconnaissance Bomber

Some of the coastal reconnaissance and torpedo-bomber squadrons of the Italian Air Force have been re-equipped with Caproni Ca. 313 twin-engined reconnaissance bombers. The Ca. 313 is armed with two machine guns in the wing that are fired by the pilot, a manually operated machine gun in the fuselage nose that is fired by the bomb-aimer, and two guns in a retractable turret behind the cabin. Bombs or a single torpedo can be carried under the fuselage.

Salving R.A.F. Aircraft from the Western Desert

A British Overseas Airways maintenance workshop established in Egypt before the war for repairing civil aircraft on the African routes now salvages and repairs all types of Service aircraft employed in the Western Desert, and has frequently turned out more than 250 repaired or rebuilt machines in a month. They are complete in every detail, and when they leave the workshop they are capable of engaging immediately in operations against the enemy. Even enemy aircraft, needed for experimental purposes, are included in the machines brought in for repair.

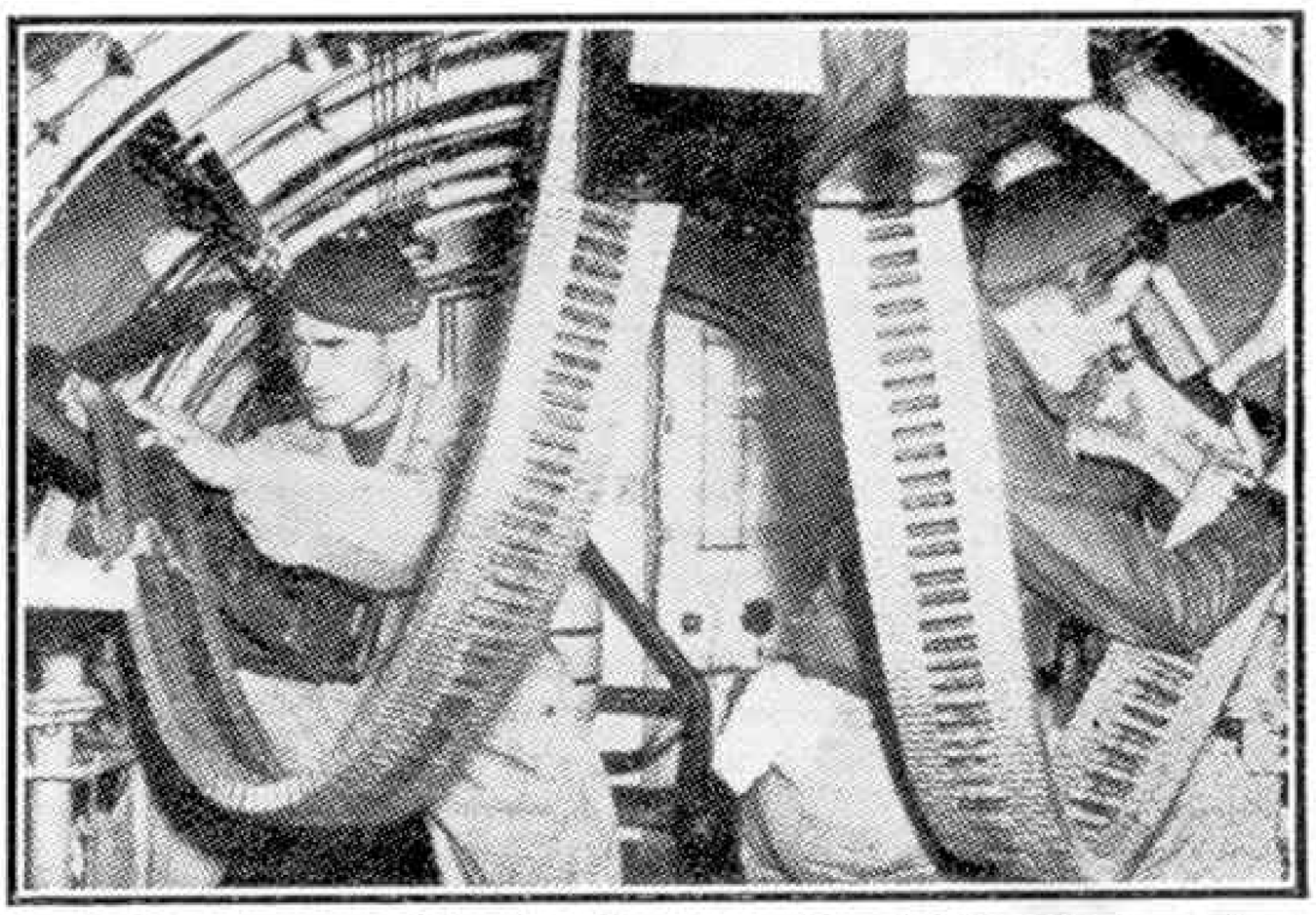
Aircraft that come to grief too far from the main workshop to be brought in are dealt with "on site" by special mobile units, which carry their equipment in "crash wagons" specially designed for the purpose and scour the desert in search of casualties. These units can undertake almost any work an aircraft may require from repairing a burst tyre to changing a complete wing, and often have to carry out the work under extremely difficult conditions.

Before the war the workshop dealt only with civil aircraft. When the campaign in the desert started Service engines and aircraft were occasionally brought in for repairs, and personnel and equipment were borrowed from the R.A.F. to cope with the extra work. Eventually British Overseas Airways set up a separate unit for this purpose, but continued to handle their own repairs in the original buildings. In 1941 fluctuations of the desert campaign rendered it advisable that the purely civil workshops should be withdrawn southwards, and the R.A.F. requested that staff and equipment might be left behind for carrying on the work on Service machines. This the Corporation agreed to do, and the present repair unit, for handling Service machines exclusively, came into existence. Five British engineers who had recently resigned from a local concern were employed by British Overseas Airways to take charge of the work, and a small staff, consisting partly of borrowed R.A.F. personnel and partly of local labour, was recruited to assist them.

Development kept pace steadily with the progress of the campaign and the staff and equipment increased until the workshops became one of the main aircraft repair centres in the Western Desert.

* * * *

It has been officially revealed that a fighter version of the D.H. "Mosquito" is in service with Fighter Command, R.A.F.



Replenishing ammunition for the guns of a "Flying Fortress" of the U.S. Army Air Forces, prior to a raid on enemy territory. Photograph by courtesy of the Editor of the "Boeing News."

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 6d., for postage.

"ONE GOOD TERN"

By A. De Selincourt (Routledge. 7/6 net)

Anthony and Robin Chale, with Ann and Elizabeth Rutherford, are old friends of ours, whose interesting adventures have been told by Mr. De Selincourt in previous books reviewed in the "*M.M.*" We always feel that we can drop in at any time on the two families, and take part in all their recreations and amusements and share in their hopes and in their disappointments. Now we join them in building a boat, a real one, half decked and rigged with a main sail and jib. They are helped by Mr. Rutherford, and by the Bosun, who produces the plans and gives them general guidance; but they themselves do practically all the work, except the heaviest jobs and those requiring special skill.

There is a wealth of interest in the construction of the boat and in sundry minor adventures, including the development of a feud with an unpleasant youth who imagines he is a real yachtsman and brags about his own boat and its speed. Then comes the great day when the "*Tern*," as the new boat is named, goes down to the sea and is launched. Sails and cruises follow, and everybody has a jolly time. Finally during a storm the unpleasant youth gets into difficulties in a rough sea and is in serious danger of drowning. From this fate he is rescued by the crew of the "*Tern*," who put out to sea in defiance of parental orders. This makes an exciting climax to a fine story, which is well illustrated.

Owing to wartime difficulties, it is impossible to guarantee prompt delivery of books ordered as described at the head of this page, but every effort will be made to ensure speedy despatch.

"ASTRONOMICAL AIR NAVIGATION"

By Squadron Leader R. Hadingham (Technical Press. 10/6 net)

So many of the young men of the country are now in our great and still growing Air Force, or hope to join it, that interest in air navigation is deep and continuous. The navigator is one of the most important members of the crew of any aircraft, and his work must be both exact and speedy. The book under review has been written to meet the special needs of practical navigators, and is suitable alike for students and instructors. Explanations are illustrative rather than mathematical, and the course is very well planned, so that a sound knowledge of the theory and practice of navigation, as carried on in the air to-day, is readily obtained.

There are nearly 60 photographs and diagrams, while many examples and position-finding problems are worked out and all the tables required are included. The book will be particularly useful and attractive to the many readers of the "*M.M.*" who are enthusiastic members of the A.T.C.

"LIVING AMONG CANNIBALS"

By Tom Harrisson (Harrap. 4/6 net)

The best way to learn the ways of any race is to live with them, and this plan was adopted by Mr. Harrisson when he wished to find out what the people of Malekula were like. This island is in the remote Pacific. The author spent a year in preparation, making himself fit and learning to speak the language he would need, to use primitive weapons and to walk silently through the jungle. Then he was taken over to the island in an outrigger canoe, landing with no weapons, no money, no food and indeed with scarcely any clothing.

The people among whom he came to dwell were among the last remaining wild people of the world, and some of them were cannibals, but they welcomed him and made him one of themselves. Many are the strange stories that he has to tell; we read how the men plan, fight and dance while the women grow food, cook and make nets, and the long stories that these strange people told of themselves, their history and customs, are full of interest.

The social order on Malekula is remarkable. The basis of it is the ownership of pigs, and a man of 1,000 pigs or more is highly venerated and privileged to wear special badges and feathers in his hair, and to cook his meals at the fire in the highest partition of the house in which he lives, those who have no pigs being relegated to a partition far away at the other end of the house. Yet the pigs are not actual possessions; indeed they are killed in a great and costly celebration when the total reaches 100, and all the "wealth" their owner has to show is a collection of curved tusks. Mr. Harrisson entered the pig trade himself by taking the animals in exchange for medical services, and he became a 100 pig man before leaving the island.

The author does not recklessly praise the Malekulans, but remarks that in the island, as in Great Britain and elsewhere, there are people who are very pleasant and others who are very unpleasant, while he cannot see that there is as much difference as many of us think between being civilised, as we call it, and being cannibals.

Many of our older readers would find this book, so obviously sincere and truthful, both attractive and informative. It is illustrated by excellent drawings and a map of the island.

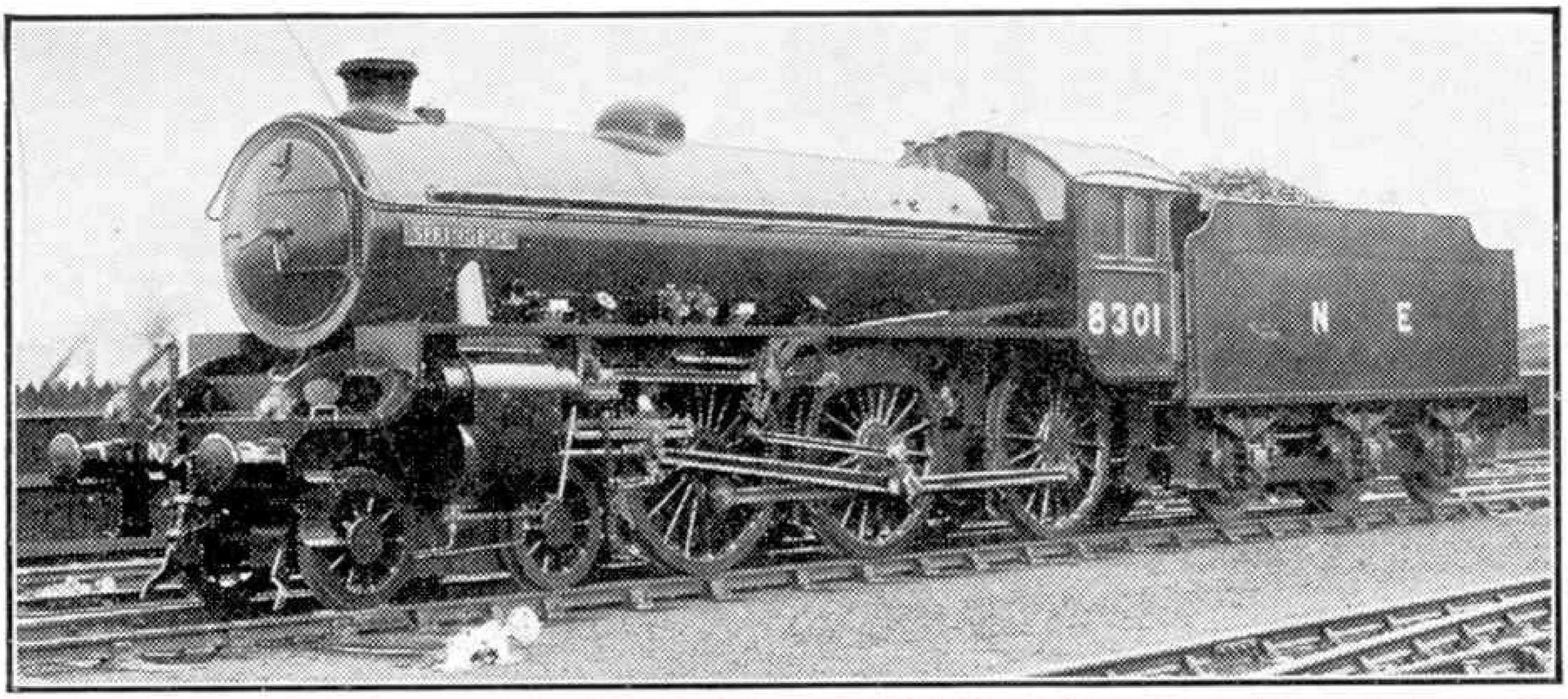
"BURMA ROAD CALLING"

By Sercombe Griffin (Harrap. 6/- net)

The Burma Road, one of the most romantic of the world's great highways, was literally scratched out of the hillsides of the mountainous country through which it passes by the fingernails of Chinese labourers, working under the direction of British and American engineers. It is interesting in itself, and the use made of it in helping China to defend herself against Japan adds to its attractions, so that it presents a fine background to Mr. Griffin's exciting story.

The tale begins in Rangoon, where Roger Wrekin is met by his father, one of the road's engineers, and the little party that we follow throughout is completed by Kahgyi, the son of the ruler of a native state on the Chinese border, who acts as chauffeur but is really there to guard the engineer against China's enemies. We accompany the group to Lashio, and then over the road itself and on to Chungking, and back again. There are dangers and adventures on every page, with spies, storms, landslides, air raids and every other excitement that one could imagine. Thanks to the resource of the Wrekins themselves, and the advice of Kahgyi and other followers and assistants, every difficulty is surmounted until the road is closed by the Japanese advance and other work calls.

The book contains six illustrations and a map.



A general view of No. 8301, "Springbok" first of the new L.N.E.R. 4-6-0 "Antelope" class of mixed traffic locomotives. Photograph by courtesy of the L.N.E.R.

L.N.E.R. Builds "Antelopes" for War Traffic

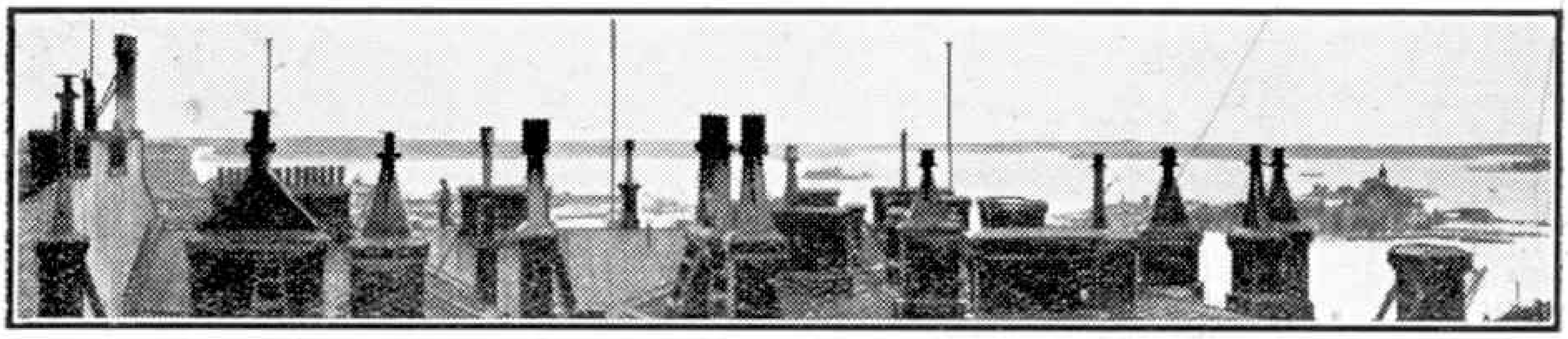
NEW 4–6–0 mixed traffic locomotives that can be used widely on all companies' lines, if necessary, for hauling troop trains, munition trains, express freight trains, coal trains and other war traffic are being introduced by the L.N.E.R. The first of the new engines, which are to be given the names of antelopes, is now at work. It is No. 8301 *"Springbok,"* so named to commemorate the recent visit of General Smuts to this country, and as the photograph at the head of this page shows, it is a handsome engine. As reported in last month's *"Railway News"* No. 8301 was on its first trials just before Christmas. These proved satisfactory and later the engine was put on the Ipswich line services from Liverpool Street.

"Springbok" has been built at Darlington to the designs of Mr. Edward Thompson, the company's Chief Mechanical Engineer. It has a tractive effort of 26,878 lb. and ranks as one of the most powerful mixed traffic locomotives in use on the L.N.E.R. As is fitting in wartime, the simplicity of the design is such that maintenance difficulties should be reduced to a minimum.

In the new class of engine the most satisfactory features in many L.N.E.R. locomotive designs have been incorporated and the expense of providing new patterns, jigs and tools has been almost entirely avoided. For instance, the boiler is the same as that fitted to the 4–6–0 class B17 "Sandringham" express passenger locomotives, but works at the higher pressure of 225 lb. per sq. in. The 6 ft. 2 in. diameter driving wheels are the same as those employed on the "Green Arrow" mixed traffic engine. For simplicity two cylinders are used instead of the three that have been standard for most L.N.E.R. designs for so long. The cylinders have a diameter of 20 in. and a stroke of 26 in., and they are from the same pattern as those used on the 2–6–0 locomotives of the "K2" class, which includes the "Lochs" working on the West Highland line, but the steam ways and steam distribution are modified to take advantage of lessons learned in recent years, and to give as direct a flow of steam as possible.

Another notable feature, which represents a departure from normal practice, is that except for the wheel centres, buffer sockets and the horns, all parts normally supplied in cast steel have been fabricated in the L.N.E.R. workshops. The running plate has been raised well clear of the driving wheels, so that these and the motion are readily accessible. An unusually long regulator handle is provided to allow for sensitive handling of the engine. Screw reversing gear is fitted.

The total weight of the "Antelopes" has been kept down owing to the need for conserving material and to allow the use of the engines anywhere on the L.N.E.R. system. The engine itself weighs 71¼ tons, of which 52½ tons are available for adhesion. The tender, which is of standard design, holds 4,200 gallons of water and 7½ tons of coal, and brings the total weight in working order to 123 tons 3 cwt.



Power from the Air

Wing Rotors Harness the Winds and Waves

By M. A. Savonius

ON all the powers of Nature utilised by man, those of the air are by far the mightiest. A horizontal column of air a mile wide and a mile high, moving at the rate of a gentle breeze, would yield more than 200,000 h.p. The energy represented by the waves of the ocean and the waterfalls throughout the world is small in comparison.

From very early times man has been able to use wind power, although the means have often been crude. The dug-out canoe of the primitive man, with a leafy branch for a sail, was moved by it, just as the full-rigger is driven across the seas; and the early windmills of the Egyptians and Hindus were the prototypes of the modern steel windmill. With the arrival of the S Rotor, invented by the late Sigurd J. Savonius, a Scandinavian engineer, there are new possibilities of using the wind to far better advantage than has been possible hitherto.

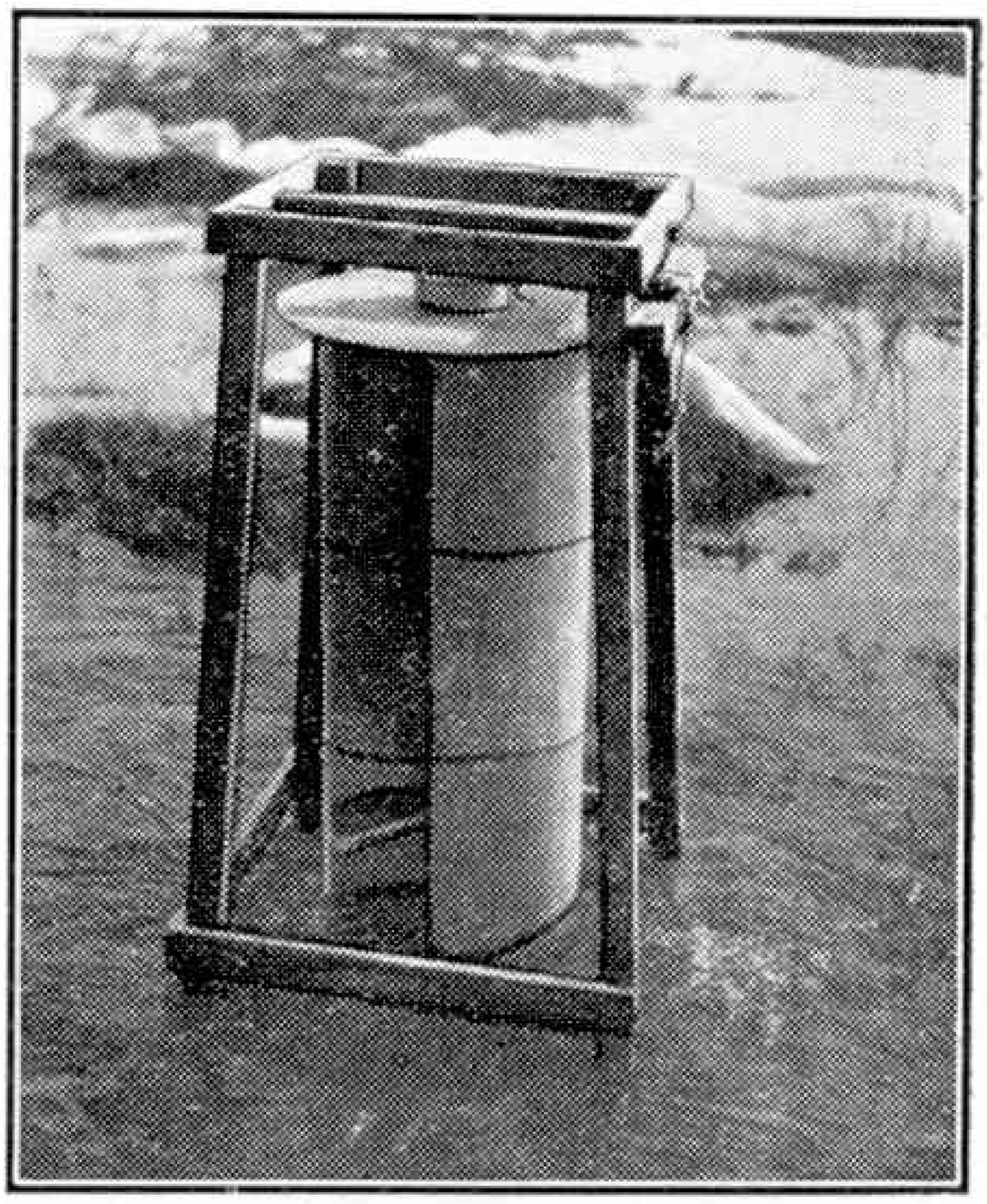
If a cylinder is cut lengthwise, and the two halves are moved sideways, a two-winged structure is formed, in cross section resembling the letter S. This arrangement, equipped with end-plates, forms the S or wing rotor. It is obvious that a machine of this construction will rotate under the influence of the wind. Only one wing at a time is active, and the other is really an obstruction. In an improved type the two halves of the cylinder are not separated so widely, so that there is an opening between the wings. Air streaming over the inner surface of one wing is then directed on to the inner surface of the other, so that both wings contribute directly to the rotation.

Compared with any other kind of windmill now used, the wing rotor is of very simple construction, and this simplicity naturally has a most important bearing upon its utility. When the power produced is taken into consideration, ordinary windmills are not only delicate and complicated, but even expensive, while a wing rotor can be built at a cost amounting to only a fraction of the price of a windmill of equal power output.

The wing rotor has very few wearing parts; in fact, in its simplest form there are only two bearings, preferably of the ball or roller type. The frictional losses, which in an ordinary windmill are considerable, due to the multitude of moving parts, bearings and gear wheels, are practically nil in a wing rotor, and no power is lost in transmission, as the power shaft is a direct continuation of the vertical axis of the rotor. Further, this needs no vane to keep it to the wind, as it is not affected by changes in the wind direction. Thus it is possible to dispense with the usual tower, as the wing rotor works just as well when placed on the upper end of a staged pole or tubular mast. Oiling can be arranged from the ground, and there is no necessity to climb to the top of a high tower to carry out regular maintenance.

The rotation speed of the rotor can be chosen within wide limits. A short and broad wing rotor has a lower speed than a tall narrow one of the same surface area, the number of rotations per minute being in inverse proportion to the width of the wing span. The form of the wing rotor is such that in construction it is strong and stable.

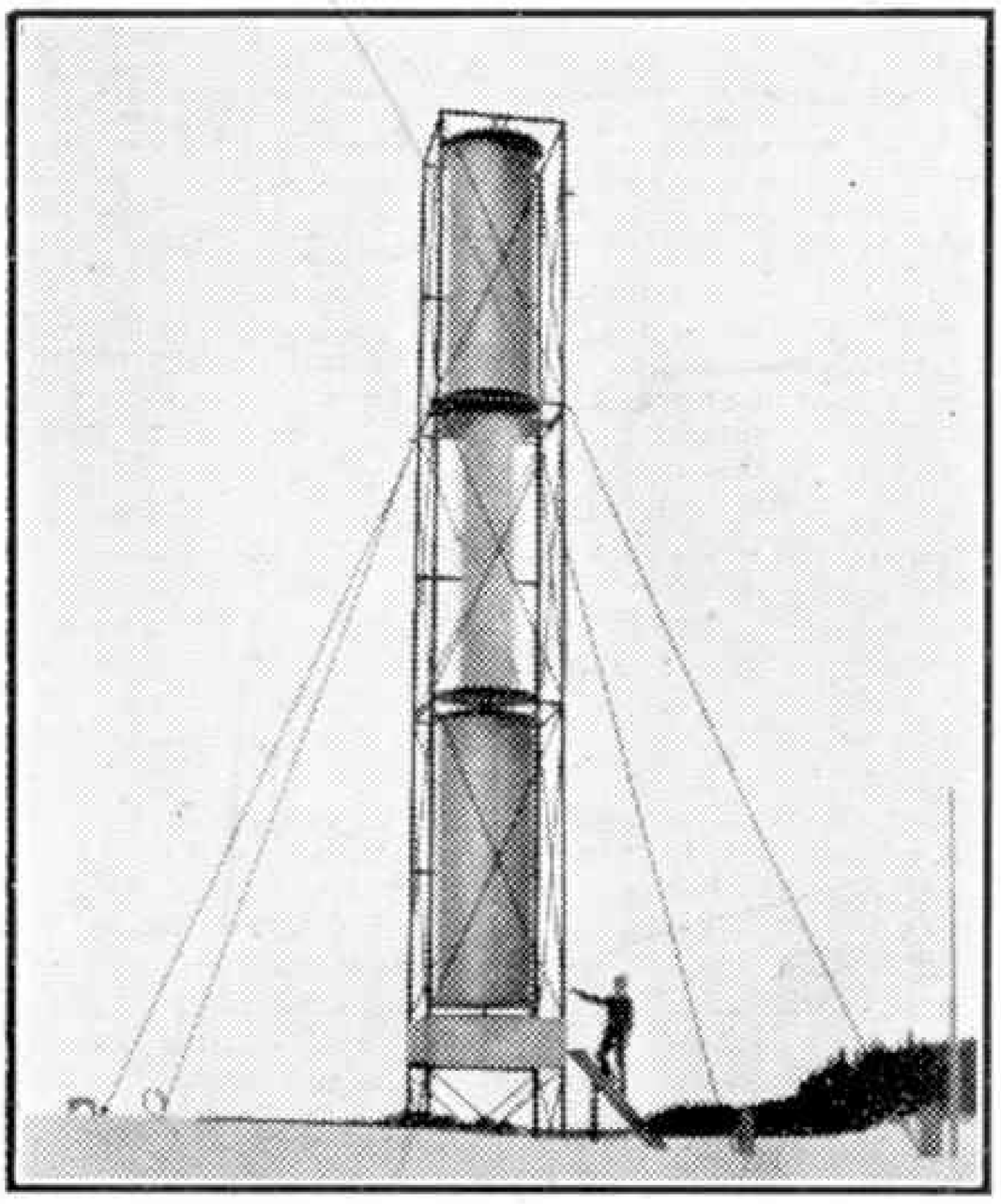
In localities where no high obstacles obstruct the wind, the rotor can be placed on the roof of a house or any convenient base. Instead of using a tower the rotor can be made tall and narrow to reach the winds of greater velocity higher up; the addition of a few extra feet in height increases the cost but little, while the building and erection of an ordinary tower is costly.



The wing rotor turns readily in water currents, so that their power can be put to good use.

Finally, it is obviously possible to construct wing rotors on a scale far greater than ever attempted with steel windmills, at a cost that is considerably less and with a great saving of material. This opens up quite new possibilities in the use of air power for producing electricity on a big scale at a very low cost. Where a smaller quantity of power is required, such as for pumping water for domestic purposes or for charging radio accumulators, a smaller wing rotor can be produced cheaply, to find extensive use among people who could not afford to install more expensive equipment.

Actual pumping tests were carried out at the



A wing rotor of the tall and narrow type.

inventor's own home with a wing rotor erected on a pier about 8 ft. above the water level. The water from the pump was led into a ¾-in. pipe joining an existing pipeline from a well on the shore. The length of the pipeline was 366 ft., and the water was elevated to a tank 50 ft. above the water-level. The pipeline had eight right angle bends as well as two valves, and altogether water passing through it had to change direction 12 times at right angles. This, with the long pipeline, caused considerable resistance, but during prolonged tests, in winds varying from 9 to 14 m.p.h., the pump delivered water at the rate of 75 to 85 gall. per hr. Stoppage occurred only if the wind speed fell below 6½ m.p.h., and the wing rotor started again as soon as the wind freshened, independently of the position of the wings and in spite of the load of water.

These tests fully confirmed earlier experiments showing that the wing rotor does over 70 per cent. more work than a steel windmill of equal size. On many farms throughout Scandinavia and elsewhere, wing rotors have been erected for pumping purposes, and in every case have proved highly satisfactory.

Extensive trials also have been made with wing rotors working in running water and in waves, and it was found that the rotor was able to turn wave action into an unidirectional rotary movement for power purposes. A plant of this kind, with a total area of 10 sq. ft., has been used for many years at Monaco, pumping sea water to the aquarium tanks of the Musée Oceanographique. Three small rotors drive two double action pumps, lifting the water to a height of 200 ft.

When the wing rotor was first being tested a number of experiments were carried out using it as a means of propelling boats, in place of sails or an engine. A small yacht was fitted with two wing rotors, equal in area to the sails usually carried, and it was found that the speed under rotors was fully equal to that under sail in winds of the same strength. Although this particular application of the rotor has little practical value at the present time, it serves to show very clearly the great power-producing capacity of the wing rotor, and provides an interesting comparison with the once famous German rotor-ship "*Buchau*," the cylindrical rotors of which had to be driven by motors to produce a forward movement, while the wing rotor relies on wind power only.

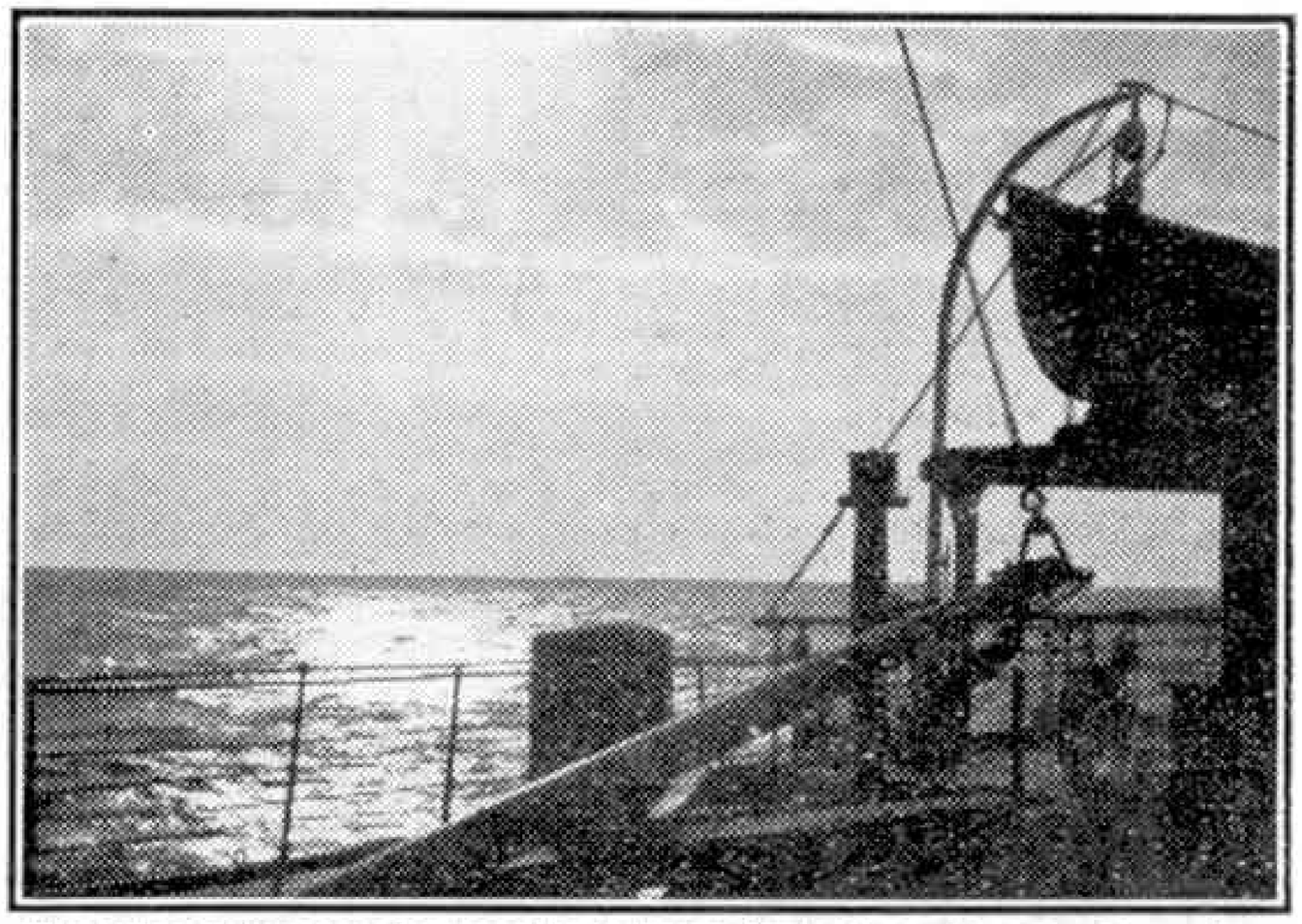
Since it was first invented the wing-rotor has undergone various slight alterations, and several minor improving features, such as self-regulating speed brakes, have been added. Essentially it will always be the same, however, and extensive tests under actual working conditions have shown that it offers the simplest and most efficient means of utilising the vast powers of the wind. It will no doubt be many years before the mighty forces of the air are used widely. Probably this will not happen until other sources of power, such as coal and oil, have begun to fail. Then man will return to his first helper, and his machinery will be turned by the force of the wind. We need never fear that this will fail, for the winds will blow as long as the Earth remains habitable.

Another application of the wing rotor that has proved of even greater importance on the Continent is the rotor ventilator, which is of special interest from an aerodynamic point of view. In this a centrifugal fan is fitted to the lower endplate of the rotor, and the combination is mounted on a central shaft on ball bearings over a suction pipe.

This arrangement was soon found to give an efficiency far greater than that of any other cowl in existence.

The strong suction power developed is of special importance where air has to be drawn through ventilating ducts of considerable length, or where the air, due to lower temperature or other causes, such as the mixture with it of heavy gases or fumes, is more dense than normal. In many cases where ordinary cowls have failed the rotor does its work perfectly, and it is used now for ventilating all kinds of buildings, including factories, cinemas, schools, barracks, swimming-baths, ice rinks, and ammunition stores, dynamite factories and gasworks, where electric fans are not permitted. Some idea of the extent to which the wing rotor has been adopted for this purpose is given by the illustration at the head of the opposite page. This shows a scene in a Scandinavian city, with rotor ventilators on almost every roof in sight.

In ships and motor boats of every type and size the rotor ventilator has proved invaluable. The ordinary ship's cowl is often inefficient and not watertight in heavy rain or spray, but the rotor lets in no water.



The wing rotor can be used to extract foul air and heavy gases from buildings, and this illustration shows it in use for ship ventilation.

New Meccano Models

Strength-Testing Machine—Potato Chip Cutter

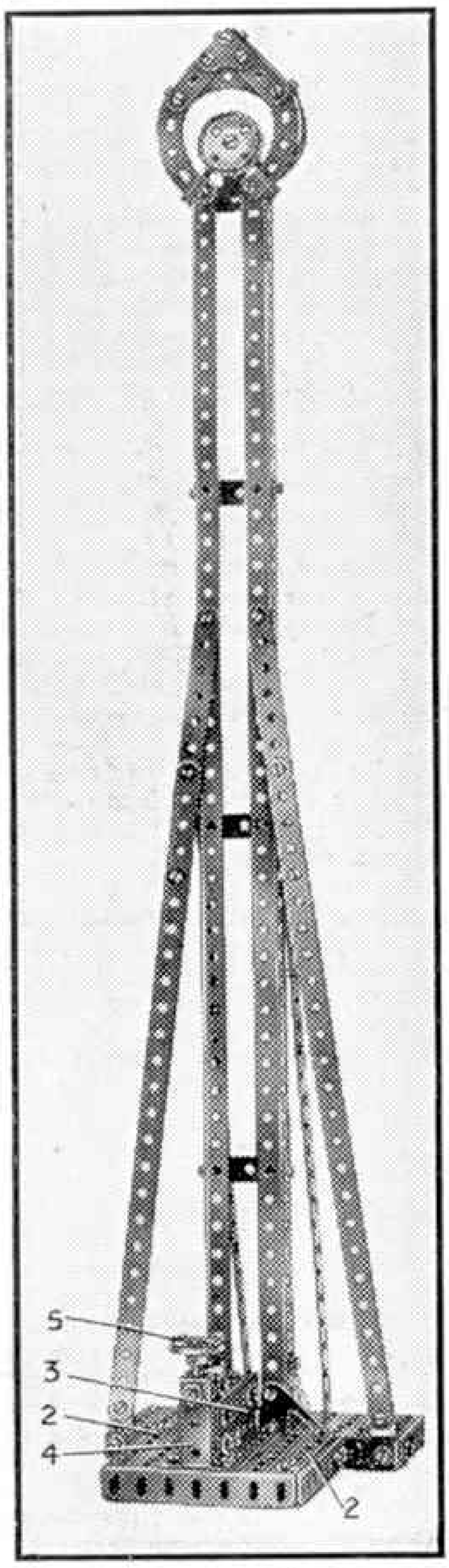


Fig. 1. The model strength-testing machine described on this page.

THE two models we are describing this month are decidedly original in character. The first is the strength-testing machine shown in Figs. 1 and 2, which is based on those usually to be seen in fairgrounds. In the real machine the blow of a mallet on a plunger is followed, if the punch is of sufficient force, by the ring ng of a bell placed at the top of a pillar. In the Meccano reproduction the plunger is simply struck by hand.

The base of the model is constructed by fitting Girder Brackets 1, Fig. 2 along one edge of a 5½" × 2½" Flanged Plate. The Brackets are fixed to 1" × ½" Angle Brackets bolted to the sides of the Plate, and are attached also to 1½" Corner Brackets but spaced from them by 1½" Strips. The Corner Brackets are then bolted to 24½" Angle Girders, which are braced by means of Strips attached to them in the positions shown and by Flanged Brackets bolted also to the 5½" × 2½" Flanged Plate. The front section of the base, which supports the plunger, consists of 3½" Angle Girders attached to the Corner Brackets by 1" × 1" Angle Brackets. The front ends of these Girders are bolted to a further 3½" Angle Girder, and a 3" × 1½" Flat Plate 2, Fig. 1, is bolted to each of them, the inner edges of the Plates being bolted to 3½" Angle Girders and 3½" × ½" Double Angle Strips. The Angle Girders are fitted with 3½" Flat Girders 3 the front ends of which are attached to a Channel Bearing 4.

The head of the plunger is a 1" Pulley 5 fixed on the upper end of a 1½" Rod journalled in a 1" × ½" Angle Bracket, which is bolted to the Channel Bearing and secured to it by a Double Bracket, and in a 3" Strip 6, Fig. 2, which is secured between the Flat Girders by Threaded Bosses, a Flat Bracket being attached to its rear end. A Collar on the lower end of the plunger rod makes contact with the end of a Rod pivoted by a Collar to the 3½" Angle Girders and Flat Girders as shown at 7, Fig. 2. The rear end of this Rod carries a Collar 8. When the plunger is hit, this Collar strikes a loose ½" Pulley 9, Fig. 2, that is free to slide between the flanges of the 24½" Angle Girders. The latter are bridged at intervals by three 1½" × ½" Double Angle Strips bolted between them as shown. The upper ends of the 24½" Angle Girders are attached to a 2" Screwed Rod together with a 1½" × ½" Double Angle Strip that in turn is bolted to a Flat Trunnion. A 1⅛" Flanged Wheel is held rigidly on a Bolt in the Flat Trunnion, and it forms a bell which rings when it is struck by the ½" Pulley. A decorative effect is provided by bolting 2½" Cranked Curved Strips and 3" Formed Slotted Strips to the ends of the 24½" Angle Girders and attaching these by means of ½" × ½" Angle Brackets to 2" Strips and a 1" Corner Bracket.

Parts required to build Strength-testing Machine: 4 of No. 1; 2 of No. 2; 1 of No. 4; 4 of No. 6; 2 of No. 6a; 2 of No. 7; 5 of No. 9b; 1 of No. 10; 1 of No. 11; 7 of No. 12; 2 of No. 12a; 3 of No. 12b; 1 of No. 15b; 1 of No. 18a; 1 of No. 20; 1 of No. 22; 1 of No. 23; 88 of No. 37a; 90 of No. 37b; 32 of No. 38; 5 of No. 48; 2 of No. 48b; 1 of No. 52; 4 of No. 59; 2 of No. 64; 2 of No. 73; 1 of No. 81; 3 of No. 90a; 2 of No. 103d; 1 of No. 111a; 1 of No. 126a; 2 of No. 133; 1 of No. 133a; 1 of No. 139; 1 of No. 139a; 1 of No. 160; 2 of No. 161; 2 of No. 215.

Our second model is the neat reproduction of a potato chip machine shown in Fig. 3; this is realistic in action and is easy to build. Its construction should commence with the base, which consists of two 3½" Angle Girders spaced apart at their front ends by a 2½" Angle Girder, and at their rear ends by a 2½" × 1½" Flanged Plate and a 2½" × ½" Double Angle Strip.

The grid for slicing the potatoes consists of two 2½" × ½" Double Angle Strips 1, bolted together and attached to the 2½" Angle Girder at the front, and also connected by a ½" × ½" Angle Bracket to the Flanged Plate at the back. Between the Double Angle Strips are bolted two Double Brackets, and at each side of them ½" × ½" Angle Brackets are fixed.

The guides for the ram, which forces the potato through the grid, consists of two 4½" Rods 2 secured

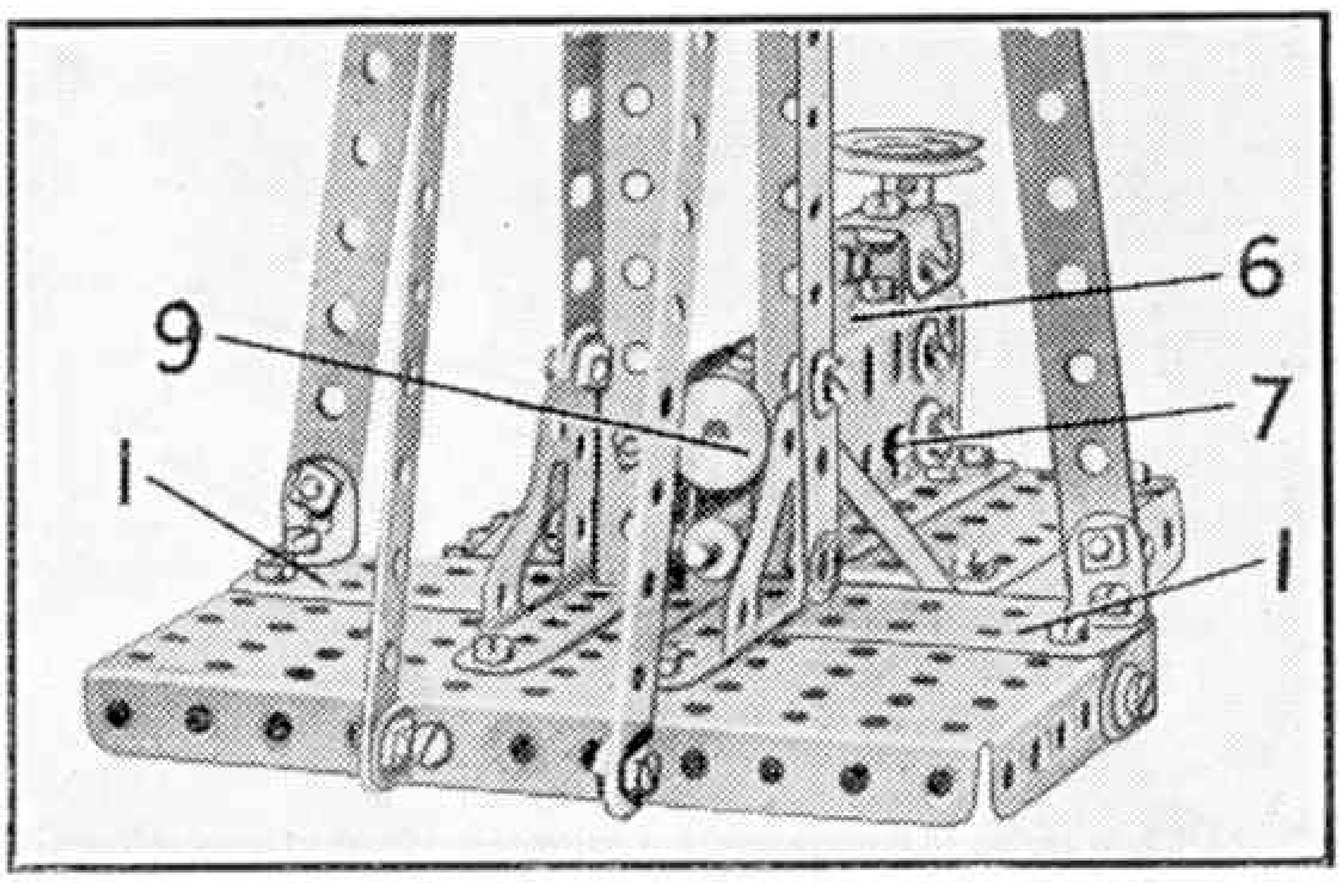


Fig. 2. Details of the plunger and mechanism of the strength-testing machine.

to the base by Double Arm Cranks. The ram itself is a square flanged plate built up from 1½" Angle Girders attached at each side to 1½" × ½" Double Angle Strips, and fitted with 1½" Strips and a 2½" Strip. The 2½" Strip is spaced from a further Strip of the same size by 1½" × ½" Double Angle Strips, and a Single Bent Strip 3 fixed centrally to the flanged plate provides a pivot for the lever. As shown in the illustration, the lever consists of two 4" Cranked Curved Strips pivoted one hole from their rear ends to the Single Bent Strip, and also attached at their rear ends to 2½" Curved Strips. Two 2½" × 1½" Flexible Plates are attached to the front Double Angle Strips by means of Threaded Bosses, which also form the means of attaching the Flexible Plates to the rear Double Angle Strips.

The complete ram is mounted on the guides by the 2½" Strips provided. The 2½" Curved Strips are locknutted by their centre holes to 3" Strips, which are pivotally attached to the base by ½" × ½" Angle Brackets. The rear ends of the 2½" Curved Strips are spaced apart by a ⅜" Bolt, carrying a Spring, the lower end of which is anchored by ½" × ½" Angle Brackets to the base. The handle for the lever is a Threaded Pin inserted in the tapped bore of a Collar held between the front ends of the 4" Cranked Curved Strips.

The model is completed by fitting a top to the guides. This consists of two Threaded Couplings fixed on the upper ends of the Rods and bolted to a 2½" Strip joining them. A Threaded Boss bolted centrally to the 2½" Strip is attached to 2½" Curved Strips at the back and front as shown.

Parts required to build model Potato Chip Machine: 2 of No. 4; 3 of No. 5; 3 of No. 6a; 2 of No. 9b; 1 of No. 9d; 2 of No. 9f; 2 of No. 11; 9 of No. 12; 2 of No. 15a; 53 of No. 37a; 47 of No. 37b; 32 of No. 38; 1 of No. 43; 6 of No. 48; 3 of No. 48a; 1 of No. 51; 2 of No. 59; 2 of No. 62b; 2 of No. 63c; 3 of No. 64; 2 of No. 89b; 4 of No. 90; 1 of No. 102; 4 of No. 111a; 5 of No. 111c; 1 of No. 115; 2 of No. 188.

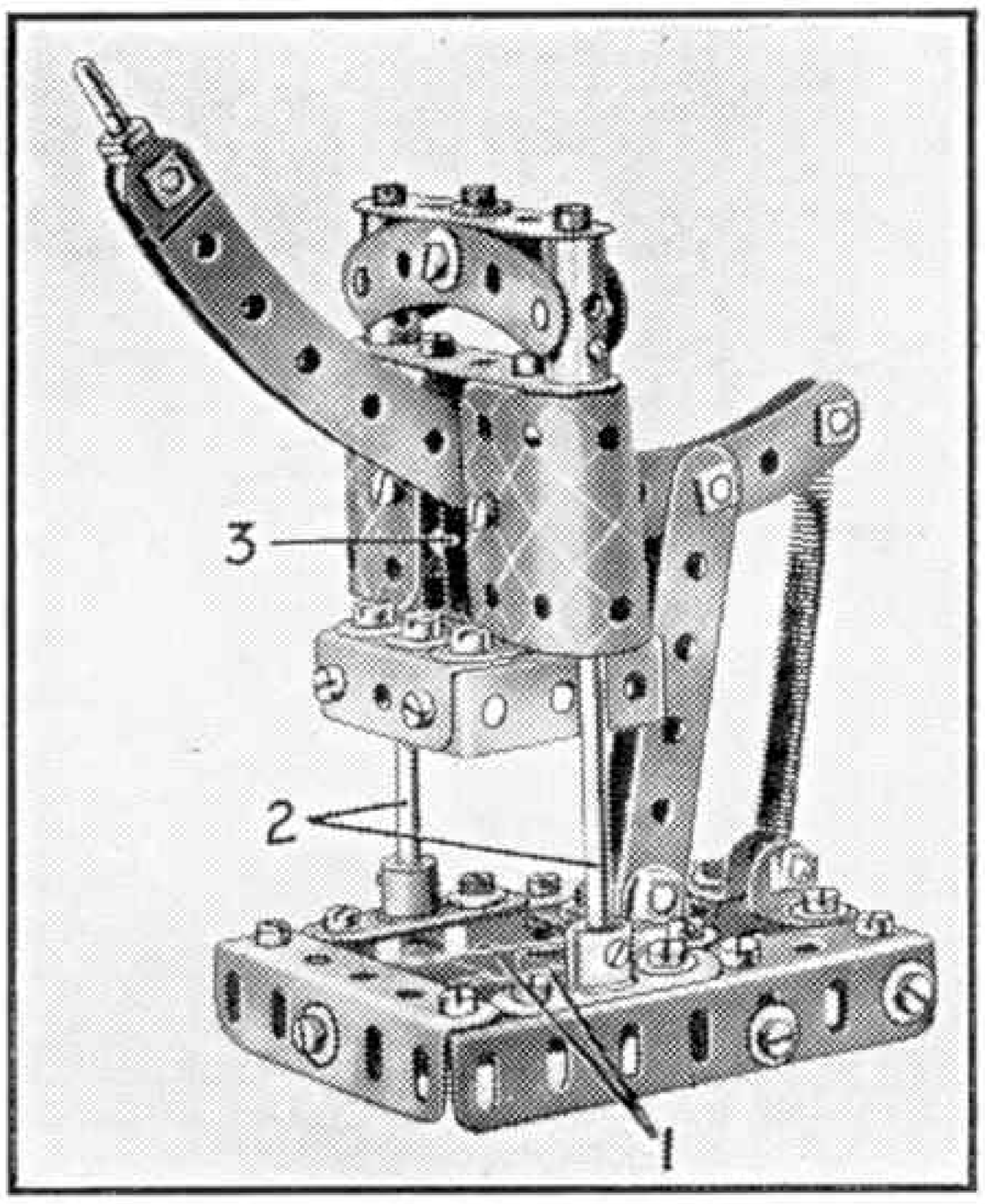


Fig. 3. A sturdy potato chip machine model that is easy to build and interesting to operate.

"Simplicity" Model-Building Contest

By "Spanner"

For our competition this month we invite readers to design and submit details of models built from a small number of parts. "Simplicity Contests" are always highly attractive, for many reasons. They give fine opportunities for showing how much originality and realism can be achieved in small models, and they appeal to enthusiasts who as yet have comparatively limited resources and are prevented by war conditions from adding to their stock. A further advantage is that the models lend themselves to simple drawings. Photographs remain the best means of showing the points of an entry, but the scarcity of films makes it difficult for many model-builders to do full justice to their products in this manner. With the aid of drawings however every model-builder, whether his Outfit is large or small, can readily enter this contest and will have a splendid chance of winning one of the many fine cash prizes offered.

Entrants in this contest should first choose a suitable subject, a simple but interesting one, and then build models from the smallest number of parts consistent with realism. Any number or variety of parts can be used, but the prizes will go to those who make the best use of the smallest number, and every opportunity of simplifying a model should be taken before details are submitted. This plan gives opportunities of designing new and ingenious uses for the parts available. More than one model may be entered by any competitor, but no single entrant can win more than one prize, however.

When the model is ready the competitor should have it photographed, or make drawings showing its general appearance and construction, and these should be forwarded, together with any notes that may be necessary, to *"Simplicity Model-Building Contest, Meccano Limited, Binns Road, Liverpool 13."* The competitor's age, name and full address must be written on each section of his entry.

Entries will be divided into two sections, A for competitors of 15 years of age and over, and B for those under 15. In each prizes of £2/2/-, £1/1/- and 10/6 respectively will be awarded to the best entries in order of merit and there will be many consolation prizes of 5/- each. The contest closes on 30th June.

Suggestions Section

By "Spanner"

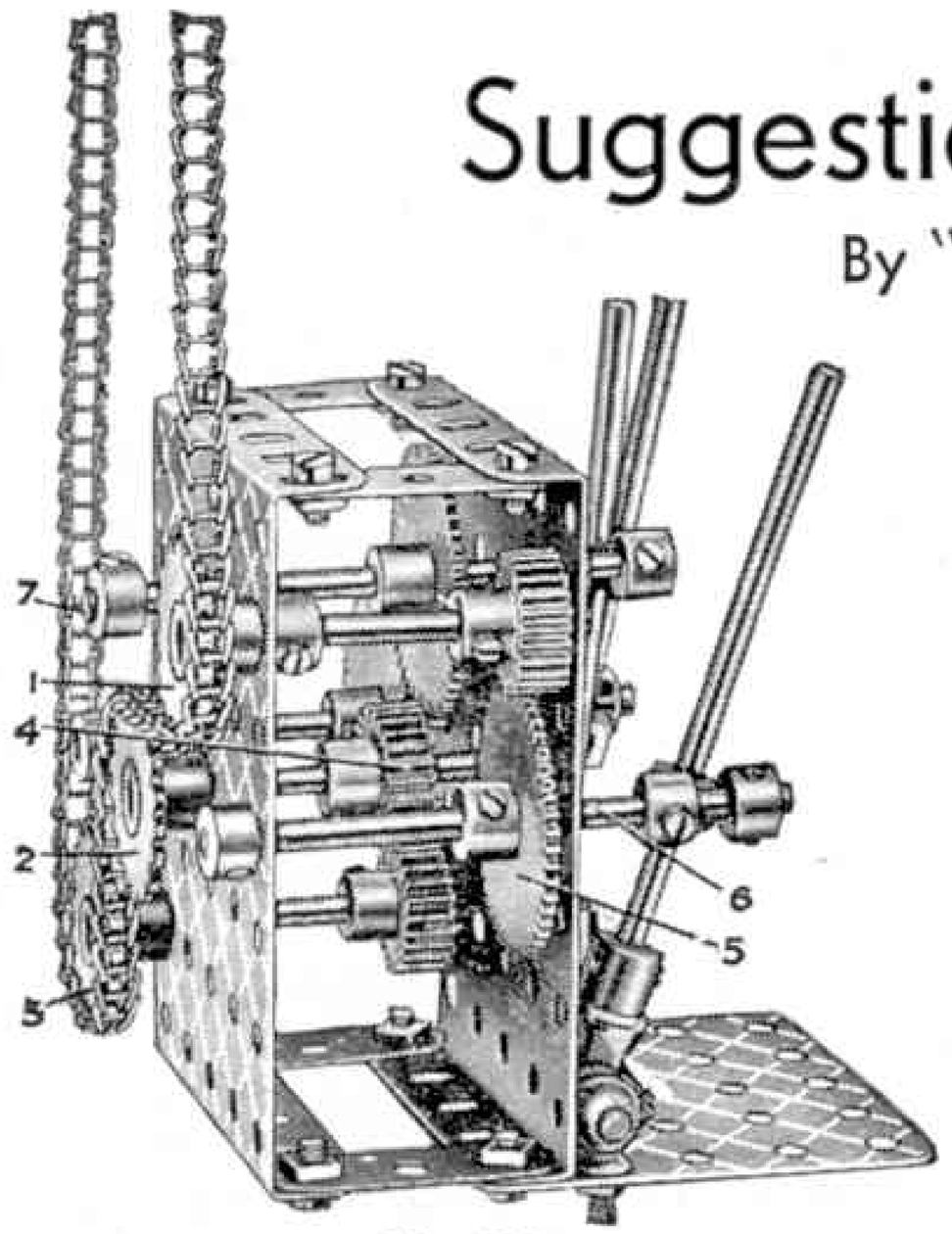


Fig. 597.

(597) A Useful Gear-Box

("Spanner")

Fig. 597 illustrates a simple gear-box that provides three movements, each of which can be independently stopped, started or reversed. The drive is taken to the gear-box by means of Sprocket Chain, which drives the Sprockets 1, 2 and 3, and is arranged so that the centre Sprocket rotates in the opposite direction to the other two. Each Sprocket is mounted on a 2" Axle Rod fitted with a Collar and a ¾" Pinion. The Pinions on the upper and lower Rods are placed close to the side-plates as shown, but the Pinion 4 is arranged approximately at the centre of its shaft. Three other Rods, each carrying a 50-teeth Gear, are arranged as shown. Each Rod has a Collar at one end, and at its other end carries two Collars spaced apart to allow the head of a Bolt to engage between them. Three control levers consisting of Rods are mounted in Small Fork Pieces pivoted on an Axle Rod held in Hand-rail Supports fixed to the base.

In the illustration the Gear 5 is shown in engagement with the Pinion on the Rod bearing the Sprocket 1. By moving the appropriate gear lever over to the left, this Gear is thrown out of mesh with its Pinion, so that no drive is transmitted, and by moving the lever still further the Gear is meshed with the Pinion 4, which causes it to rotate in the opposite direction.

The other two shafts operate with similar movements, and it will be seen that one can be controlled separately and made to rotate in either direction or remain stationary.

(598) A Simple Light Signalling Outfit

(R. Simpson, Norwich)

Visual signalling in Morse code by means of light flashes is still of considerable importance, especially as it is often necessary to maintain complete radio silence in order to avoid disclosing ship positions and movements. Fig. 598 shows a simple outfit by means of which flash signalling can be carried out between two friends seated at opposite ends of a table. This also incorporates a buzzer.

The operating key is formed from a 3½" Rod, fitted as shown, which makes contact with a ½" 6 B.A. Bolt 1 fixed to the base but insulated from it. The tension of the key is adjusted by a Bolt, locked in a Double Bent Strip, also secured to the base but spaced from it by three 1½" Strips. The spring for the key is formed from the bolt and spring of a Spring Buffer, which is passed through the base and held in the boss of a Double Arm Crank bolted underneath it. The front end of the key carries a Collar, in the upper tapped bore of which is locked a Chimney Adaptor and a 1¼" Disc by

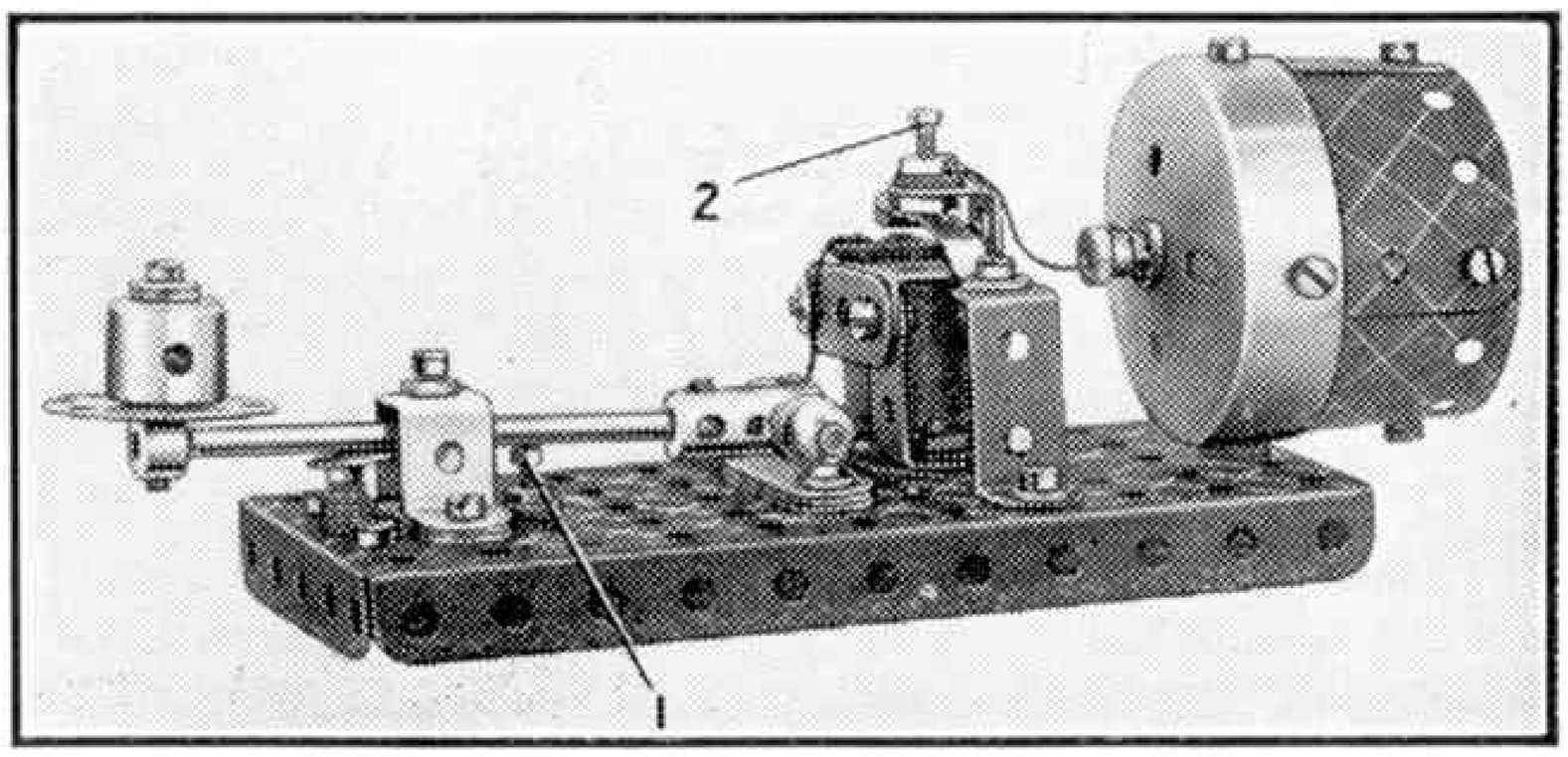
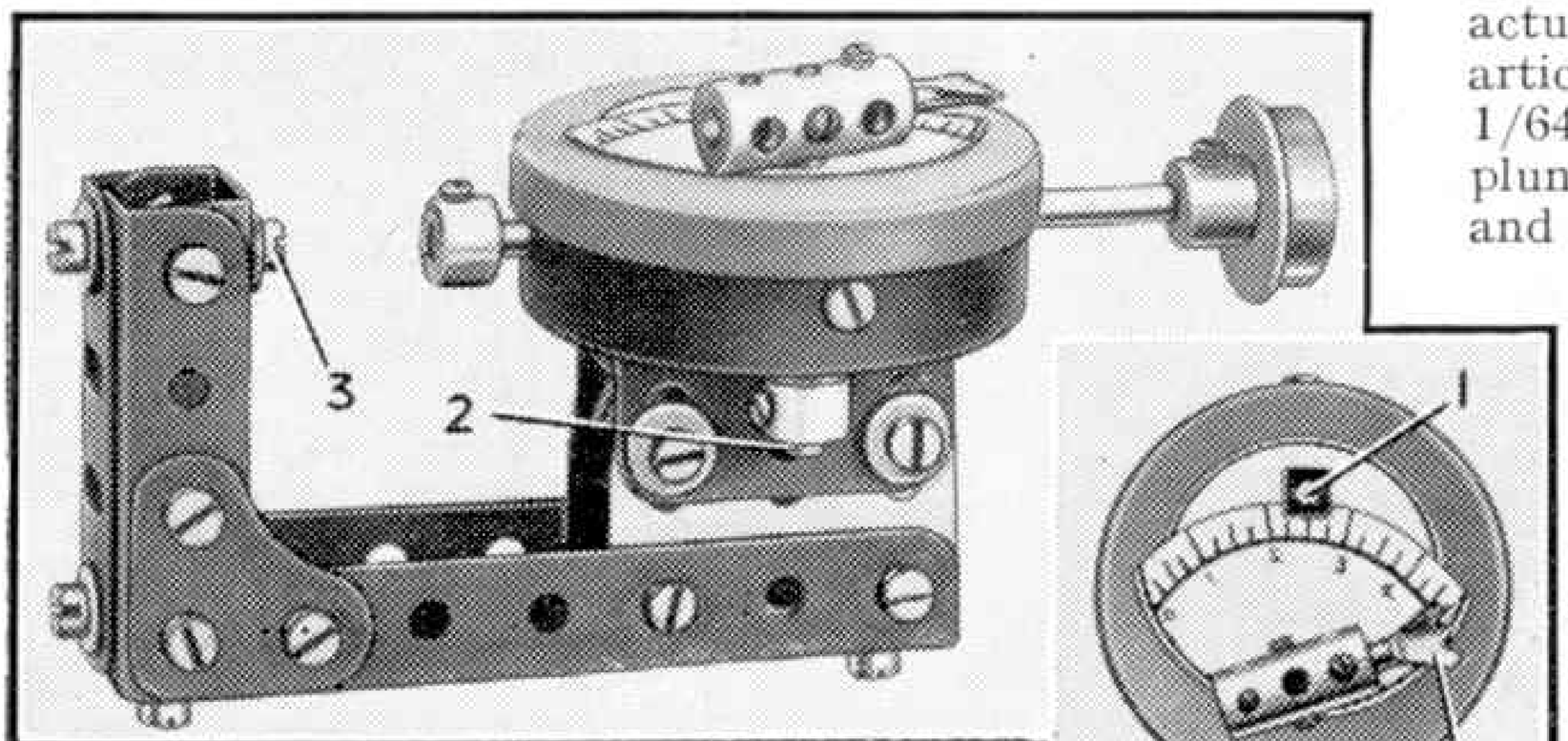


Fig. 598.

means of a $\frac{3}{4}''$ Bolt and Washers.

The buzzer solenoid consists of a Meccano Bobbin, which is fully wound with 26 S.W.G. Wire and is fitted on a $1\frac{1}{2}''$ Rod held in a Double Arm Crank bolted to the underside of the base. The Bobbin



Figs. 599 and 599a.

is held in place between $1\frac{1}{2}''$ Strips, attached at their inner ends to a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip and a $1'' \times \frac{1}{2}''$ Angle Bracket spaced by a Double Bracket and bolted to the base. The armature is a Pendulum Connection, the hole of which is enlarged slightly to take a $\frac{7}{32}''$ Grub Screw locked between two Nuts. The contact screw 2 is a $\frac{1}{2}''$ 6 B.A. Bolt fixed between two Nuts to the upper lug of the $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip but insulated from it, and it should be adjusted until the "buzz" produced is of the required pitch and tone. The lamp is a $3\frac{1}{2}$-volt Meccano Lamp inserted in a Lamp Holder bolted to, but insulated from, a Wheel Disc placed inside a Boiler End insulated from the base.

One lead wire from a 6-volt Transformer or other suitable current supply is attached to the 6 B.A. Bolt 1, and the other wire is connected to an insulated $\frac{1}{2}''$ 6 B.A. Bolt to which is also attached one end of the buzzer coil. A wire from this Bolt is also taken to the Boiler End of the lamp. The return lead from the lamp is attached to the contact screw 2, together with the other lead from the buzzer coil.

To use the lamp only the Boiler End should be earthed and lead to Bolt 2 connected with Bolt 1 to the battery.

(599) Recording Micrometer

(P. Fraser, Cambridge)

Figs. 599 and 599a show a recording micrometer in which a Worm is used as a substitute for a Rack Strip in a rack and pinion mechanism. The instrument records directly on a scale and will actually measure small articles with an accuracy of 1/64″. It consists of a plunger in a Boiler End and carrying a Worm and a Collar in which is inserted a Bolt. This Bolt prevents the plunger from rotating by engaging between two Flat Brackets secured on a 1 in. Screwed Rod 1, Fig. 599a, bolted to the Boiler End. The Worm meshes with a $\frac{1}{2}''$ Pinion on a $1\frac{1}{2}''$ Rod 2 journalled in the Boiler End. A short length of Spring Cord is attached to the Rod 1, its other end being connected to the $\frac{1}{2}''$ Pinion, after passing around its boss, by a Nut screwed on a $\frac{7}{32}''$ Grub Screw.

A Collar on the left-hand end of the plunger makes contact, when the latter is depressed, with a Bolt 3.

A pointer 4, consisting of a Centre Fork held in a Coupling fixed on Rod 2, moves over a scale calibrated as shown in Fig. 599a.

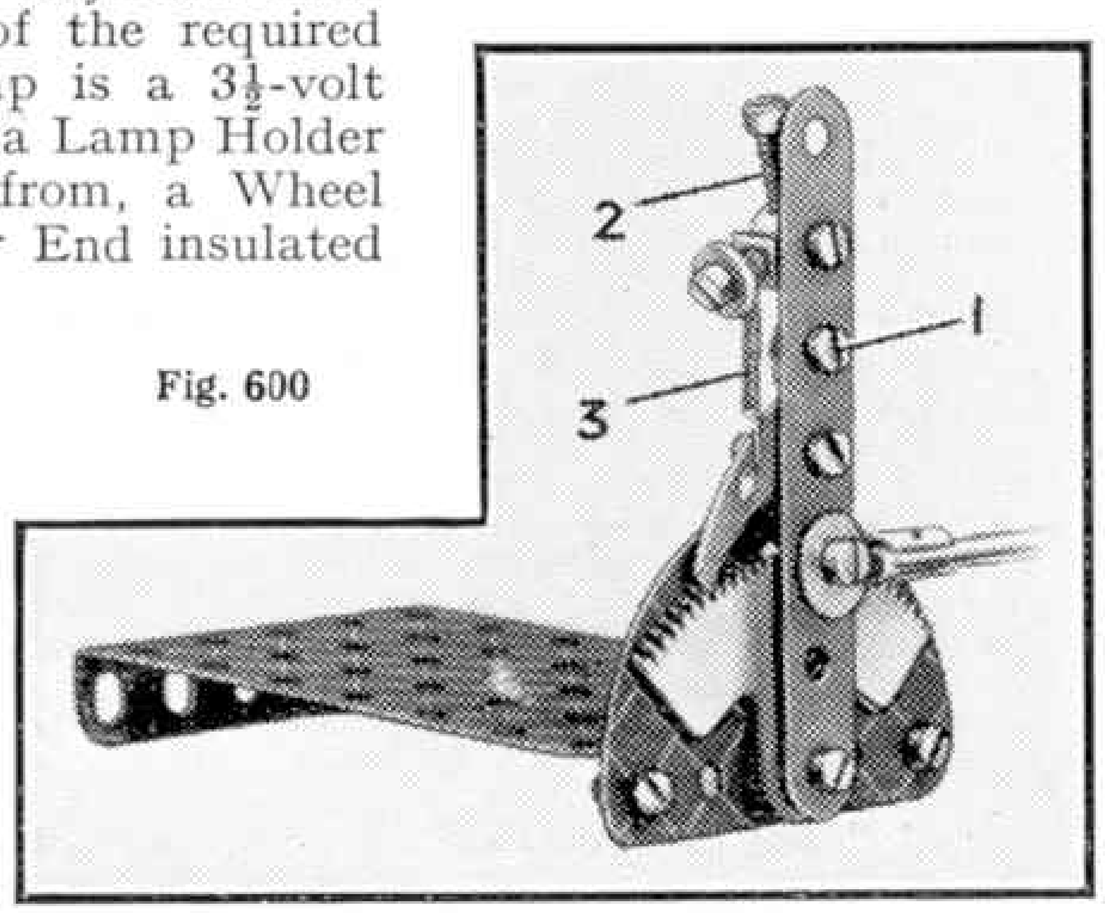


Fig. 600

(600) Ratchet Brake Control Lever

(E. Woodward, Liverpool)

Fig. 600 shows a neat ratchet control lever that will be found useful by designers of model brake mechanisms. A $3\frac{1}{2}''$ Strip carries a Pawl without boss, which engages the teeth of two Rack Segments and is spring loaded by means of a short length of Spring Cord attached to Bolt 1. The brake is released by a bell crank 2, the other arm of which is attached to the Pawl by Spring Cord 3.

Club and Branch News

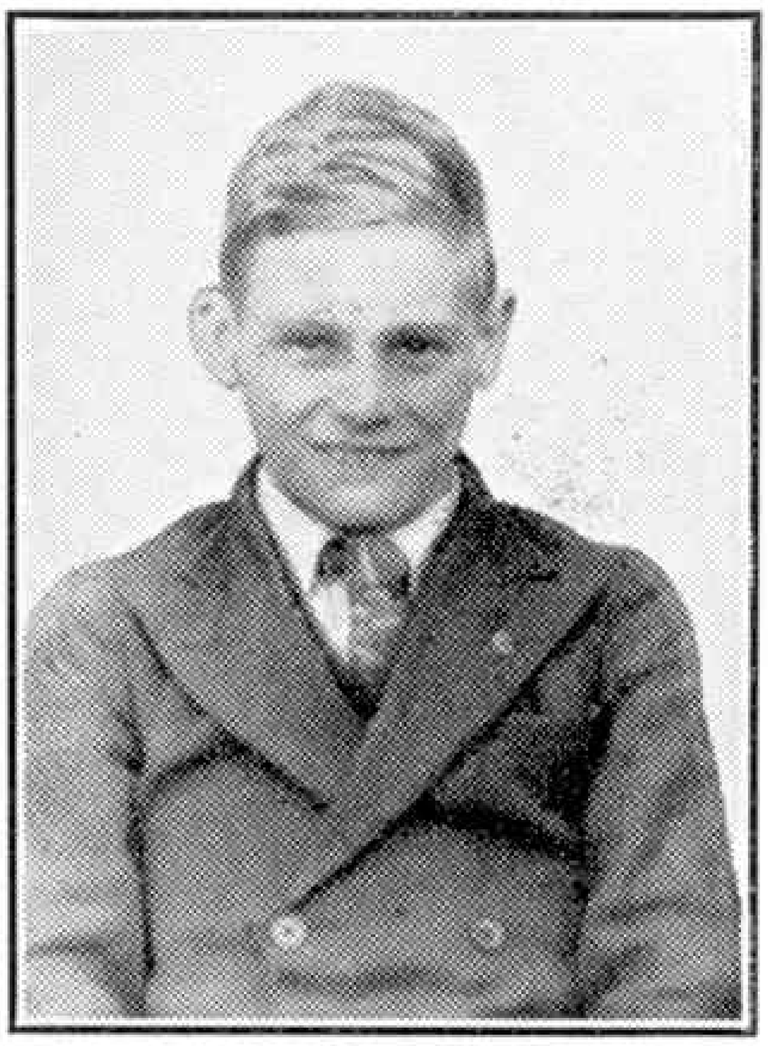
WITH THE SECRETARY

THE AIMS OF THE SUMMER PROGRAMME

With the month of May we enter into the outdoor season. Leaders should have two aims in arranging this. One is to provide for the thorough enjoyment of games, rambles, excursions and cycle runs; the other is to make the programme serve as a prelude to the coming winter sessions. At the moment the sunshine may make us forget these, or at least think they are far away, but success in them can best be assured by preparing now.

To begin with, it is never too early to consider plans for the programme, and officials generally should try to work out new ideas for these whenever they have a little time to spare. A more immediate necessity is to keep a lookout for recruits who will strengthen the Club. These can be found in summer as well as in winter. Members should always wear their badges, especially when they take part in excursions of any kind, so that boys who are interested and see the members of a Club having a thoroughly good time will make enquiries and eventually perhaps join them.

Then there is the Club room to consider. It is not sufficient to turn the members of a Club, armed with Meccano Outfits, into a bare and unattractive room, and expect them to have the good time to which all Meccano boys are entitled. Some effort should be made to make the room attractive as well as to provide the necessary facilities for model-building and other hobbies that are carried on. Summer is the best time to take this side of Club work in hand, for the regular programme will suffer if it is left until the beginning of the winter sessions. At the same time it is not necessary to interrupt the enjoyment of the summer programme for this purpose. Instead wet days can be devoted to organising matters, and in every Club volunteers will readily undertake various little jobs that will help to brighten up Club meetings and make them more effective. This again will have a good effect on recruiting.



A. A. Sharing is Secretary of the Cockfield, Co. Durham, Branch of the H.R.C. This Branch was incorporated in June of last year and members have had splendid times with the Branch layout, on which many miniature troop "specials" and out-of-gauge loads have been dealt with. Parties and, in the summer, swimming meetings also have been enjoyed.

Proposed Clubs

CHALK—Mr. B. H. Gray, 14, Thang Lane, Chalk, Gravesend, Kent.

MOORTOWN—Mr. M. Ableson, 34, Nunroyd Road, Moortown, Kent.

BIDFORD-ON-AVON—Mr. T. Hale, 13, Steppes Piece, Bidford-on-Avon, Warwickshire.

Proposed Branches

WASHINGTON—Mr. A. R. Sillito, 46, North Avenue, Washington, Co. Durham.

HIGH WYCOMBE—Mr. D. Ward, 93, Plummer Road, High Wycombe, Bucks.

Club Notes

NAVENBY M.C.—The Club has just celebrated its first birthday. It was founded on 13th February 1942 and received affiliation in the following October. Model-building Nights form the chief feature of the programme, and games also are played, while a Stamp Section also has been formed. Members are keen on recruiting, and the officials are keen and capable, so that excellent progress should be made. Club roll: 12. *Secretary:* P. I. Addison, High Street, Navenby, Nr. Lincoln.

GRASMERE M.C.—Good prizes were awarded in a Model-building Contest and an Animal Show, in both of which there was keen competition. Model boat racing is another pursuit of members, who have also enjoyed cycle runs in the hilly country around Grasmere. A Hornby Railway has been built in the open air, with Meccano bridges, cranes and other models placed at suitable points. There are seven stations and most of the trains operated are for passengers. Paper salvage continues. Club roll: 18. *Secretary:* J. H. Hardman, "Bainriggs," Grasmere.

KILROOT (CO. ANTRIM) M.C.—The Winter Sessions now ended have been very successful. Membership has increased and prizes have been awarded for model-building skill. Observation tests, drill and general knowledge questions also have proved popular. The summer programme includes rambles, cycling and outdoor observation tests, and the secretary would be glad to hear from anyone interested in the Club and its work. Mr. L. E. Pavitt has kindly accepted Leadership. Club roll: 15. *Secretary:* J. C. Mulvagh, Dobbs' Cottage, Kilroot, Carrickfergus, Co. Antrim.

Branch News

MILL STREET AND ST. OWENS (HEREFORD).—The members of this newly-incorporated Branch are very enthusiastic and attendance is excellent. Track meetings are being held weekly, and special attention has been given to practice in the correct operation of signals. *Secretary:* D. Apperley, 59, Mill Street, Hereford.

ACKWORTH SCHOOL—An extensive layout re-building plan has been carried out, special attention being given to such details as banking at corners and the provision of crossovers. Careful tests have shown the work to be excellent. Stations and bridges are now being constructed. The largest passenger station has seven roads, and there are also a goods yard and a large station for electric trains only. *Secretary:* J. H. Mayo, Ackworth School, Ackworth, Yorks.

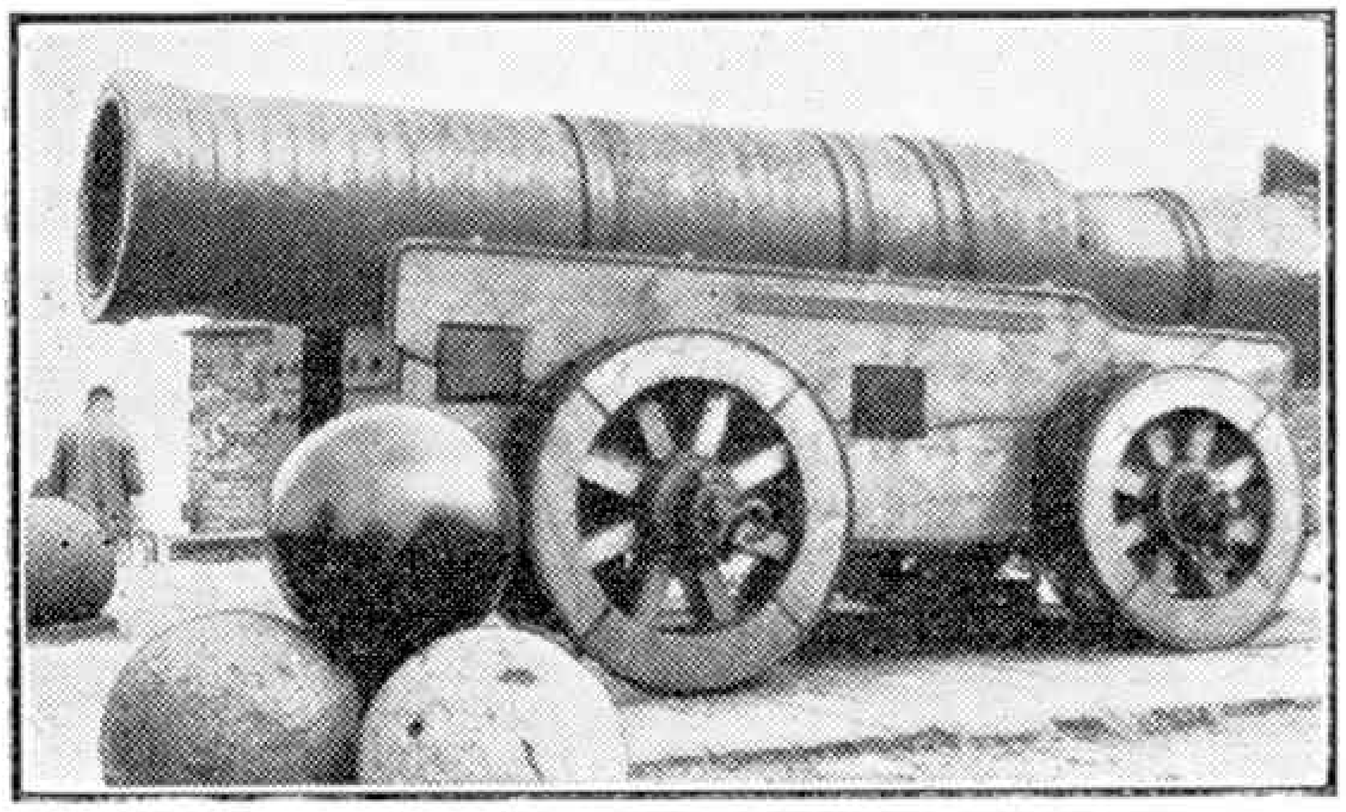
GUISELEY—This recently incorporated Branch has held excellent meetings, at which timetable operations were carried out on excellent tracks. A permanent track has not yet been laid down, new layouts being introduced from time to time in order to increase the variety and interest of working. *Secretary:* Miss N. Barrett, 4, Ashtofts Mount, Guiseley.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

A PIONEER HEAVY GUN

Mons Meg, a gun that 500 years ago was no doubt thought to be the last word in efficiency and destructive power, is of considerable interest in these days of modern warfare, when cross-channel artillery duels between huge guns are not uncommon. I saw this famous piece of ordnance and photographed it at Edinburgh Castle. The gun itself is made of iron and was made in the 15th century, probably in Flanders. Its length is 13 ft. 4 in. and its bore 20 in. An old document puts it on record that when loaded with 105 lb. of powder and elevated at an angle of 45 deg. it would, on discharge, project a stone ball 2,867 yards or an iron ball 1,408 yards.



Mons Meg, the famous 15th century cannon in Edinburgh Castle. Photograph by A. W. Ball, Beeston.

The carriage is of comparatively recent date, but its design is based on the representation of Mons Meg in two stone panels, of late 16th or early 17th century date, which were discovered in the castle. In spite of the unwieldiness of this cumbersome piece of artillery there are records of its having been used by King James IV of Scotland at the siege of Norham, and of its being taken to Holyrood and back again. In 1754 Mons Meg was taken to the Tower of London and there it remained until 1829, when it was returned to Scotland.

A. W. Ball (Beeston, Notts.)

A DOOMED DERBYSHIRE DALE

Another section of the lovely Derwent Valley will soon be under water. A new reservoir is needed to supply Derby, Nottingham, Leicester and Sheffield with more water, and a dam is being built across the valley about two miles above Bamford station. When it is finished, the villages of Derwent and Ashopton will go under the waters of the Ladybower Reservoir. With them will go the old coaching inn at Ashopton, and Derwent Hall.

The Hall was built in 1672 by Henry Balguy and was used by him for his banking business. He kept his stock of gold in one of its rooms. Later the Hall became a seat of the Duke of Norfolk, and though additions were made to it, they were all in keeping with the original style. To-day it has lost much of its glory and is used as a Youth Hostel.

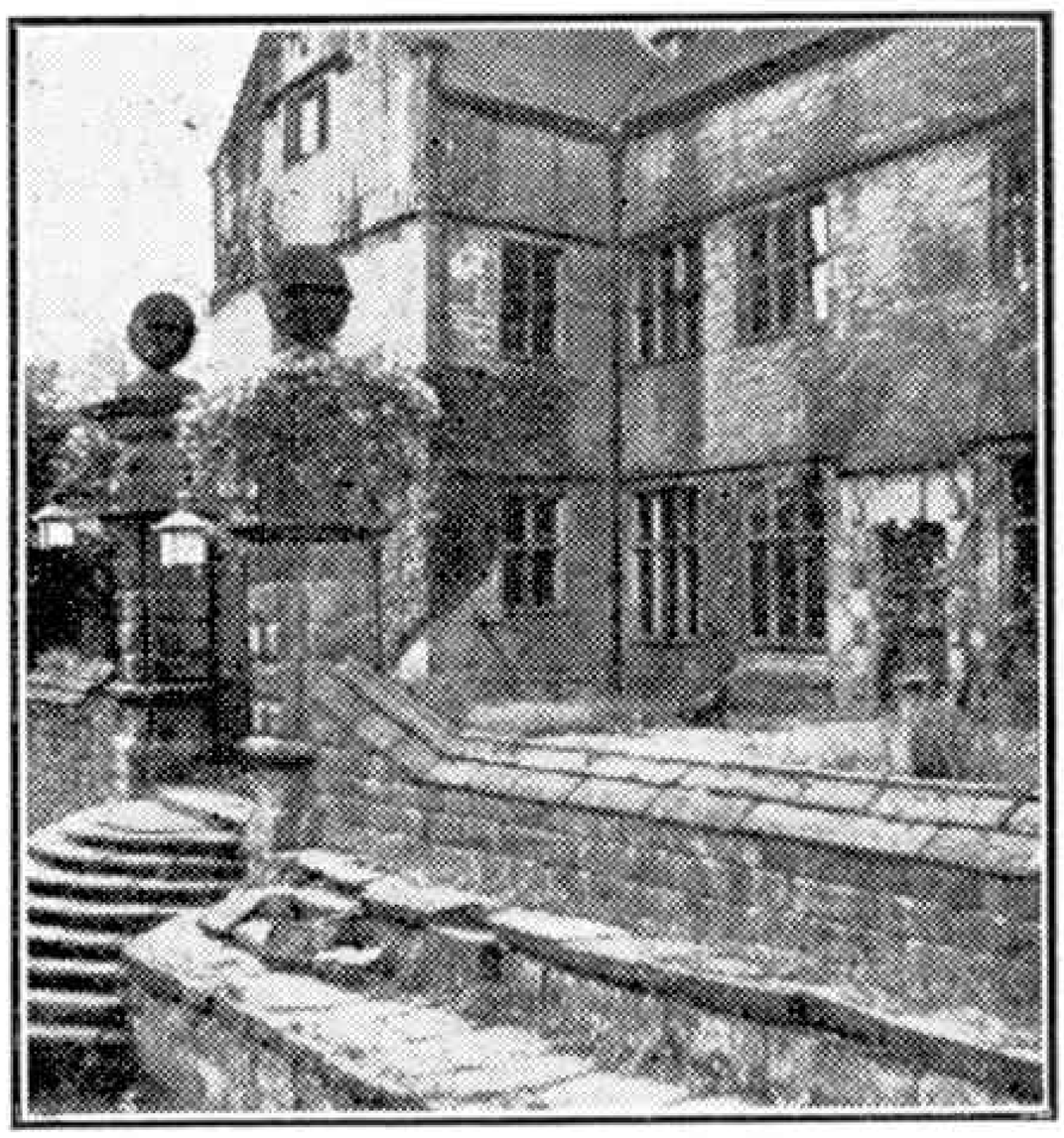
A packhorse bridge, said to be the finest of its kind in Derbyshire, crosses the River Derwent between the Hall and Bridge End farm. There is a scheme in hand to save it from the flood by taking it down, stone by stone, and rebuilding it a mile north of the Howden Reservoir at Slippery Stones. The position is considered perfect for the purpose, for the bridge will still cross the Derwent and will be on a packhorse track.

R. W. Turner (Long Eaton).

AN IRISH BASCULE BRIDGE

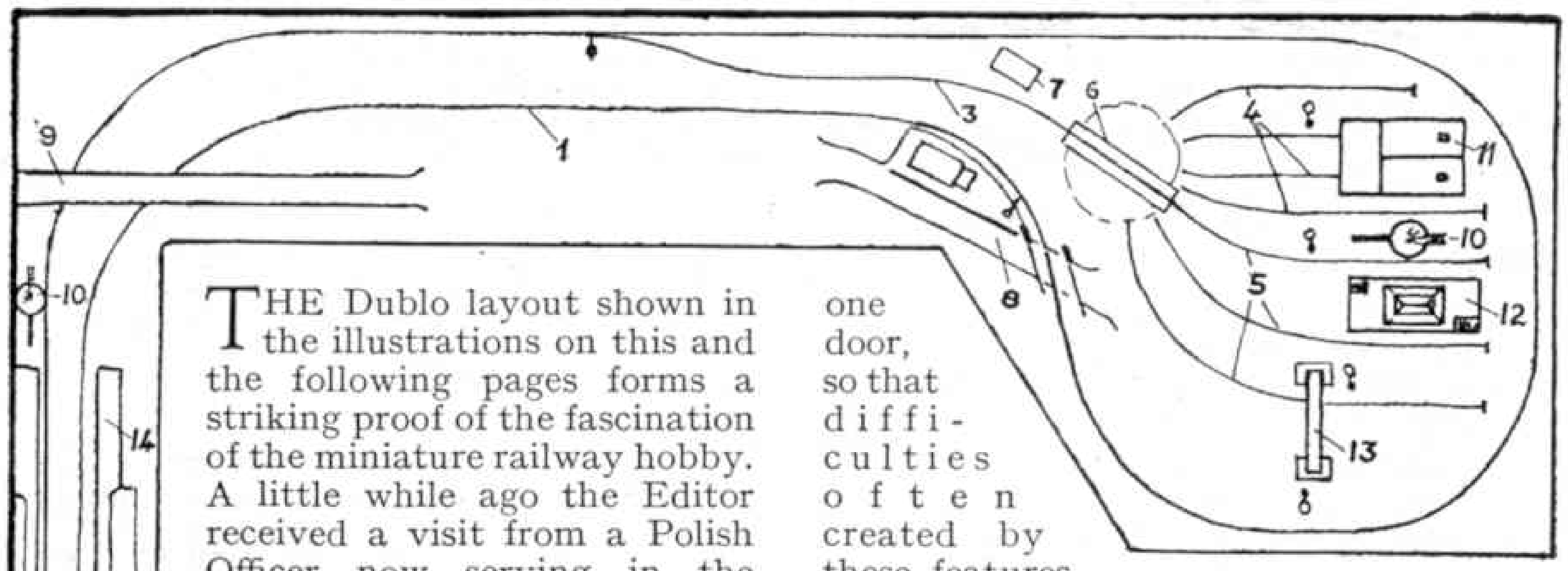
There is another bascule bridge in Ireland very like the one at West Bridgford described in the March "*M.M.*" It is over the Grand Canal at Monastrevan and can claim precedence over that at West Bridgford, or the new one in Dublin, because it has been in use, as far as I can ascertain, since the canal was built 80 or 90 years ago. It is rather larger than the one illustrated in last month's "*M.M.*" and is opened in a slightly different manner. There is a windlass that unwinds a rope from a drum about 3 ft. in diameter, which is mounted on an axle near the top of the standards. Chains from the end of the span pass over two smaller drums on this shaft and hang down inside the standards, fastened to two small counterweights. The windlass is operated by the key used for opening the sluices in the locks. The counterweight on the beam consists of a length of heavy chain wound around the end-piece. On account of the age of the bridge heavy vehicles are not allowed to cross it, but have to make a detour of about a mile and a half.

J. Matthews (Portarlington).



Derwent Hall, Derbyshire. This is used as a Youth Hostel, and will disappear when the Ladybower Reservoir is completed and filled. Photograph by R. W. Turner, Long Eaton.

A Polish Officer's Dublo Layout

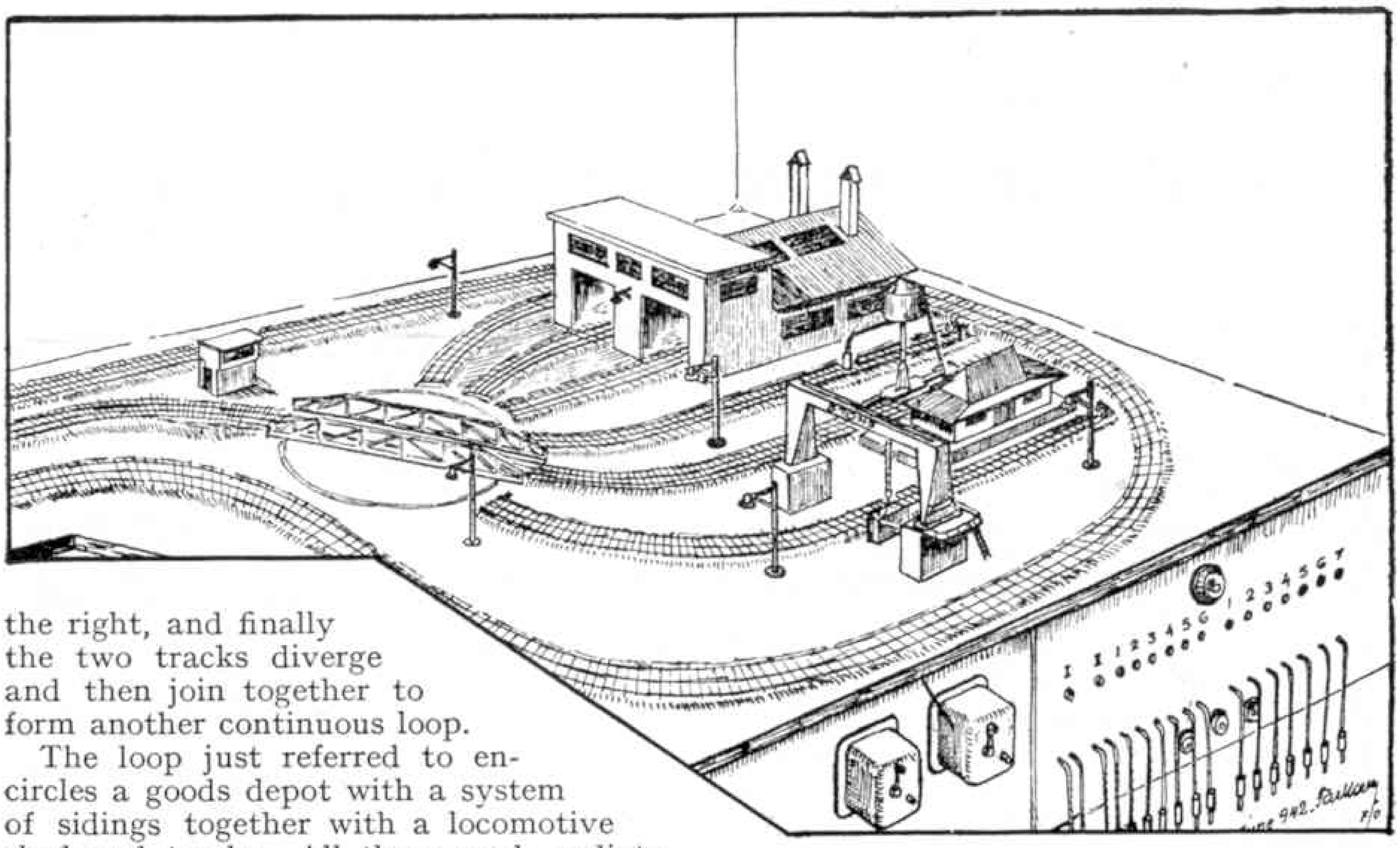


THE Dublo layout shown in the illustrations on this and the following pages forms a striking proof of the fascination of the miniature railway hobby. A little while ago the Editor received a visit from a Polish Officer now serving in the R.A.F., but in peace-time a skilled designer of Diesel-engined locomotives. The accompanying illustrations have been prepared from the excellent sketches and diagrams that he passed over to the Editor, and the following story of his Hornby-Dublo layout written from his notes on the development of the system.

Some time ago our contributor made the acquaintance of the owner of a small Dublo layout consisting of an oval track and a siding. After some discussion these two enthusiasts decided to make this the basis of a larger scheme in a 12 ft. by 9 ft. room; this was specially suitable, apart from the fact that it could be spared, as it has one window only and one door, so that difficulties often created by these features were easily dealt with. Plans were prepared and the unusually interesting form of continuous layout shown in the diagram on this page was adopted. In effect it consists of an elongated oval track adapted to follow the walls of the three sides of the room, the complete system being laid down on shelving fixed for the purpose.

The original equipment of the small layout was not sufficient for the new scheme and in wartime conditions it was not possible to obtain any new material. Local press advertisements provided some used stock, however, including two Dublo Standard Tank Locomotives, rails, points and some wagons. Although the number of points available was really not enough for the layout as planned, track laying was begun and certain details were modified to suit the material in hand.

Inside the loop at the lower end of the main line in the diagram is placed a four-road terminal station. The four roads converge into two beyond the platform ends, and join the main track where there is a narrowing down of the baseboard to lead to a 40 in. bridge. The length of track from this point onward through the passing station is laid down to the normal Dublo double-track standards and has the appearance of an ordinary two-track main line. Passing on under a concrete type bridge, the line swings to



the right, and finally the two tracks diverge and then join together to form another continuous loop.

The loop just referred to encircles a goods depot with a system of sidings together with a locomotive shed and tracks. All these roads radiate from a turntable, which provides the means of transferring engines or wagons from one line to another, this arrangement being adopted owing to the small number of points available. Access to the turntable from the main line is gained in the usual way by means of points as shown. The actual details of this end of the line are well shown in the illustration on this page.

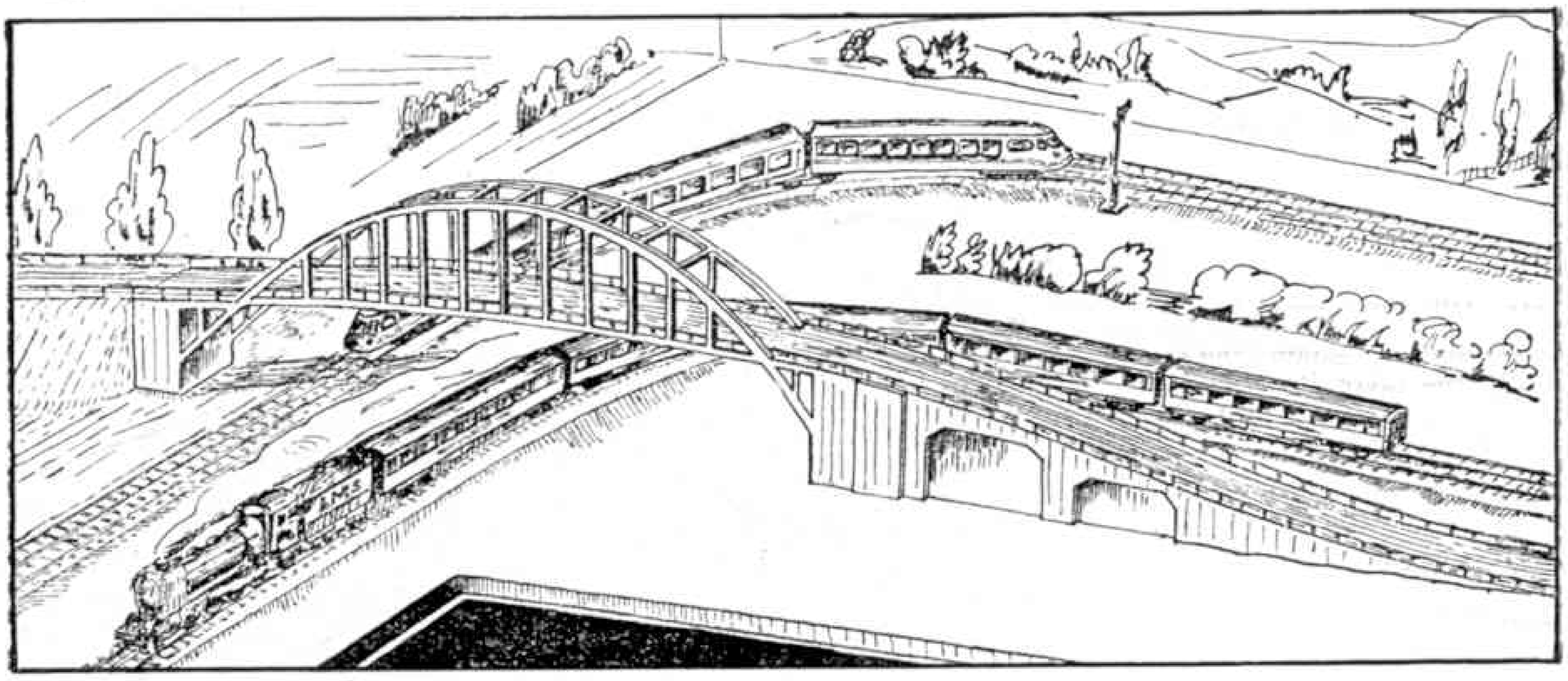
The railway is electrically operated and is divided into two main sections each governed by a standard Controller. The division between the two sections occurs at the passing station, and makes it possible for trains to be stopped automatically on passing from one section to the other, if the same Controller is switched off. In addition, various other tracks, such as the platform lines at the terminal, and the goods yard and engine depot roads, form separate sections to which current is only supplied through connections at the switchboard or control panel. For this purpose plug and socket connections are arranged on the panel, the whole arrangement being compact and efficient.

Key to the Plan on the previous page:

1, Main lines; 2, Lines to terminus; 3, Siding to turntable; 4, Engine roads; 5, Goods roads; 6, Turntable; 7, Signal box; 8, Level Crossing; 9. Concrete bridge; 10, Water tower; 11, Engine shed; 12, Goods depot; 13, Overhead crane; 14, Passing station; 15, Steel bridge; 16, Junction box; 17, Stone bridge; 18, Terminal platform; 19, Terminal building; 20, Net fence; 21, Wall.

The terminal station itself is a typically modern structure, having the usual station buildings and offices at the inner end of the platform. Windows and doors are cut out and properly modelled, the window openings being glazed with cellophane, and the building and the outside premises are electrically lighted. The platforms are roofed, not by all-over arched roof, but each platform having its own roof supported by columns running down the centre. This arrangement keeps the trains in full view all the time and is very effective.

Owing to the shortage of purchased track materials, the lines serving the terminal station were home-made. At the end of the curved approach from the main line the tracks are spanned by a signal bridge, also home-made, as was the signal cabin, from which train movements in and out of the station are supposed to be controlled. Another interesting feature close by is the overbridge crossing the main line and leading down to the station yard as shown in the plan on page 170. This bridge was made of plywood 4 mm. thick and painted to represent old stone construction. From it a fence runs alongside the main line as far as the curve passing the terminal station frontage. This represents a net fence, the net being actually cut from a Christmas stocking. On the appropriate side there "grow" a



number of bushes made up of cotton wool, dyed and "teased" into realistic shapes. These different items successfully separate the station yards or road approach from the main line loop, which of course is not supposed to be there at all! The complete terminal and main line section at this end of the layout which we may describe as lying south of the girder bridge is assembled as a whole on a single board 6 ft. by 3 ft.

The girder bridge is an interesting structure made of 1 mm. and 2 mm. plywood, its design being based on that of the Sydney Harbour Bridge. It was assembled from strips looped together and painted light grey to represent steelwork, and it has a very realistic appearance.

The passing station already referred to is made up of two standard Hornby-Dublo Main Line Stations in the way often suggested in these pages. It represents the usual type of country station on a main line but it has no goods sidings or depot. Home and starting signals are provided for both tracks and there is also, at one end, a water tower made to serve both lines. In the top left-hand corner of the plan is another bridge spanning the railway. This represents a road bridge, and details of its general appearance are well shown in the illustration on this page. This illustration shows also the sloping ramp or approach designed to be in keeping with the bridge itself and leading down to rail level.

At the opposite end of the bridge the roadway continues at high level and the lineside scenery at this point is so arranged that the road appears to be carried on into the distance. This is an important point that is often missed by miniature railway engineers. An overbridge is frequently planted down over the line without any correspondence between it and the general surroundings. Here, however, the bridge has the appearance of having been built for a purpose, and this feature is found also at the site of the "old stone" bridge in the lower left-hand corner of the layout.

The plan on page 170 includes also a level crossing with gates that provide road access to and from the goods yard inside the main loop in the right-hand top corner of the layout. This part of the layout is shown on page 171. It forms a most interesting area, of which the focal point as explained previously is the turntable. Altogether seven yard tracks are served by the turntable and four of these are engine roads, the centre two of the four entering the locomotive depot. The remaining tracks are goods roads. Taking the locomotive department first, the two-road shed is of unusual design in that the entrance is surmounted by the office and control building, so that the engines pass literally underneath the eye of the "Superintendent" as they go in and out. This portion of the structure has a flat roof and wide windows in the modern style. Behind the office portion, the roof is peaked and is provided with skylights and tall smoke vents. Further natural lighting is afforded by wide windows in the side walls.

A water tower of similar construction to the one at the station, with a long swivelling delivery arm and "bag," is situated between the locomotive and the goods tracks, so that an engine does not have to be actually "on the shed" in order to fill up its tanks, but can do so while engaged in shunting in the goods yard. The use of the turntable to transfer engines and vehicles together from one track to the other is interesting, the table being long enough (*Continued on page 178*)

Operations on a Portable Hornby Layout

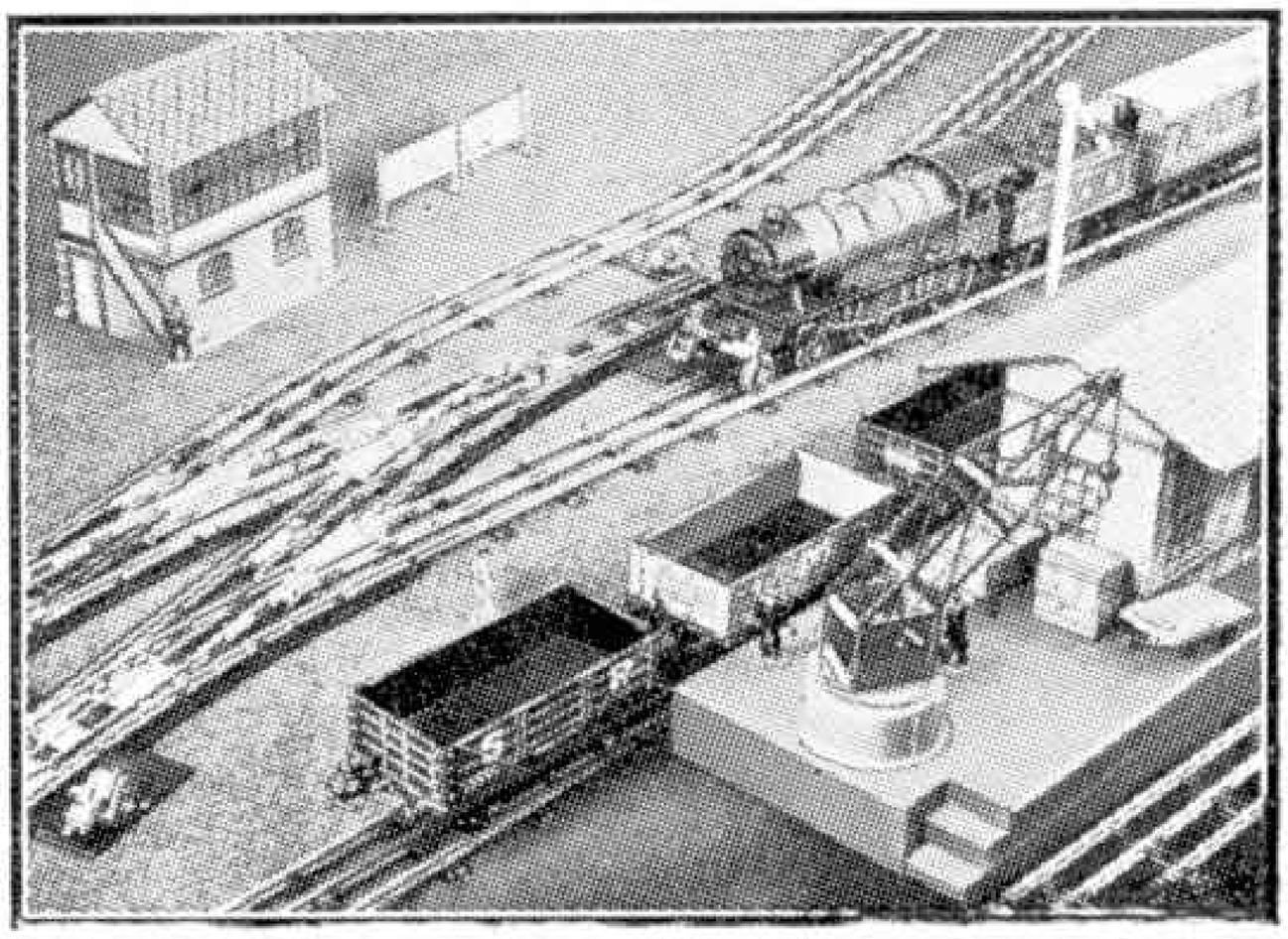
THE formation shown in the diagram below shows the scheme normally adopted by a reader, Donald G. Stephens, of Penzance, for his portable Hornby Railway. The plan may vary in detail from time to time—an advantage of a portable system—but the main principle remains the same. A continuous main line in the favourite oval form has outside it a branch leading to a terminus and goods sidings. Within the oval a diagonal track is arranged so that a return path to the terminus is afforded; we shall see how it can be used later when we make an imaginary tour of inspection.

As might be expected, our West Country enthusiast follows G.W.R. practice on his railway, although the various stations have imaginary or adopted names. Thus the terminus, appropriately enough for a Hornby system is called "*Binns Road*"; the passing station on the main line is named "*Bexhill*," and the halt is known as "*Somerdale*." Let us begin our inspection at the "*Binns Road*" end of the line.

The terminus has two platforms, one of them being an island so that there are three roads. Two of them form the main platform roads, while the other is a "bay" that is useful for milk, parcels and general van traffic, in addition to odd passenger trains. The platforms are each 3 ft. long, and the station building, including offices and entrance hall, was made from a large cardboard box. Frontage details were designed on drawing paper, and this, after colouring, was pasted on to the sides and ends of the box. The general effect of the station is helped by the provision of Hornby Platform Machines and similar items, and by the use of Dinky Toys figures.

Parallel to the terminus is the main goods depot and its sidings, which can accommodate some 20 vehicles. Near the respective points where the goods lines and the terminal station lines converge is a No. 1 Signal Cabin, from which the "signalman" has a good view of operations generally. Near this cabin are points that give access to the turntable, and from this radiate the shed track and the siding alongside it that make up the locomotive depot. The shed itself is a home-made building of wood and cardboard.

Passing on to the main line, the more important of the two stations is "*Bexhill*." This consists of a Hornby No. 3 Station extended in length by the use of a section of Passenger Platform, a scheme that has often been illustrated in these pages. "*Bexhill*" has also goods accommodation, there being two sidings with a small wooden platform or loading "bank" serving one of them. An interesting use of an M Series Station is seen at "*Somerdale*" where it forms a "halt." Separating "*Bexhill*" and "*Somerdale*" is a tunnel and close by this is normally arranged a miniature village together with a farm, both of which mean a certain amount of traffic for the "halt."

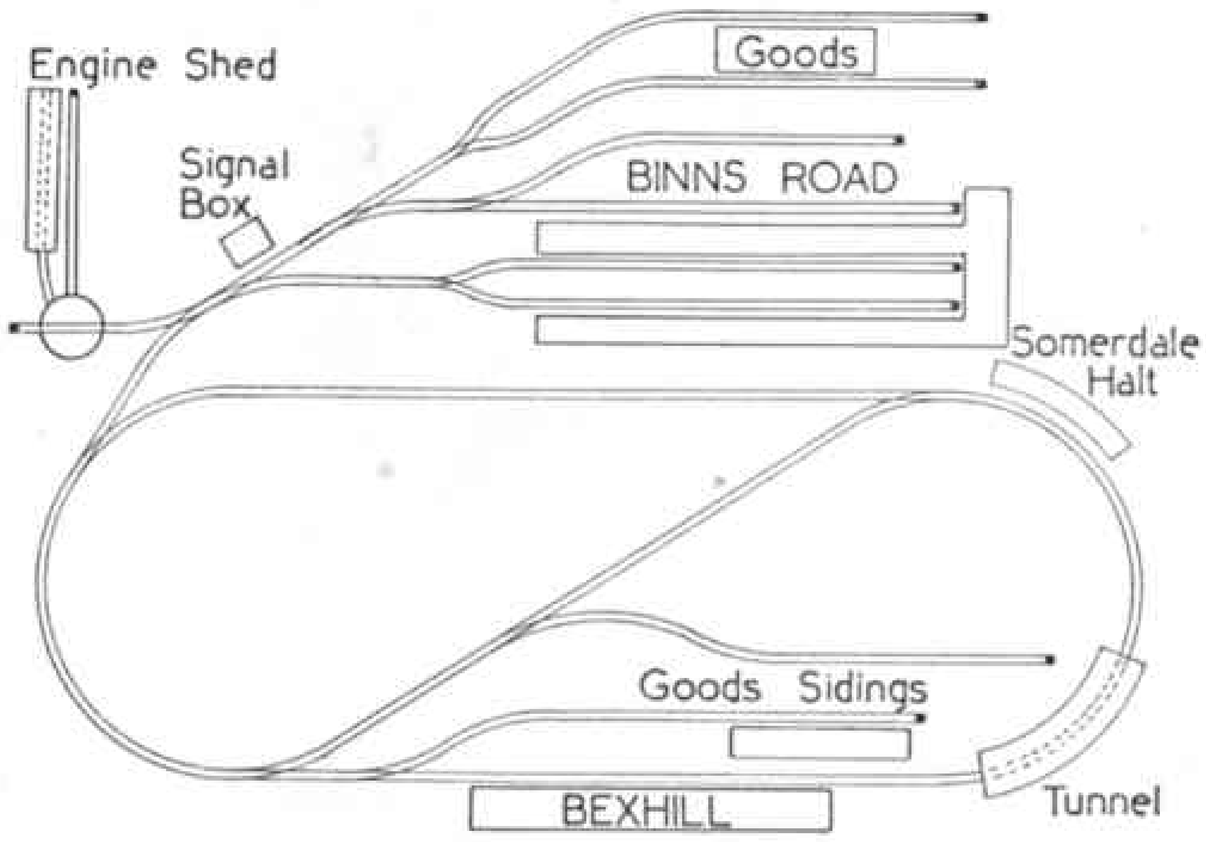


A scene on a portable layout showing the realistic effect obtainable by the use of standard Accessories only.

Interesting possibilities are afforded by the introduction of the diagonal "loop." A train can leave the terminus or the goods depot alongside, make its way on to the main line, and after calling at the station or "halt" as required by the working arrangements, be diverted to the return "loop" at the "*Somerdale*" end, and then run back to the departure point. On the other hand the train on reaching the main line, could have been passed on to the loop straight away, so reversing its direction quite early in the course of the particular working. The loop also makes a convenient refuge for a short train that has been travelling in an anti-clockwise direction and is due to return to the terminal branch; possibly another train is ready to leave the terminal. The latter train can be run out to "*Bexhill*," and as soon as it stops, the "refuged" train can be worked away to its destination.

Another possibility is that a double-headed passenger train can leave the terminus with a van in the rear destined for "*Bexhill*" sidings. When it stops at the station the leading engine can be detached, and run forward to reach the rear end of the train by means of the return "loop." It is then in a position to draw off the van and back it into one siding, and remain there while the passenger train goes on. At a later stage in the operations, possibly after a little marshalling of vehicles that may be in the sidings, it can bring its train out and work it to the terminal depot.

The largest engine in use is a No. 1 Special Tank, which is a true mixed traffic unit, handling either passenger or goods trains with equal ease. For more local work and for shunting there is one of the capable M3 Tanks. Both these engines are of course in G.W.R. colours. The tender engines are M1/2 veterans, both coloured green and numbered respectively "3031" and "3435." These two often work together on heavy passenger trains.



The layout of D. G. Stephens, Penzance, described on this page.

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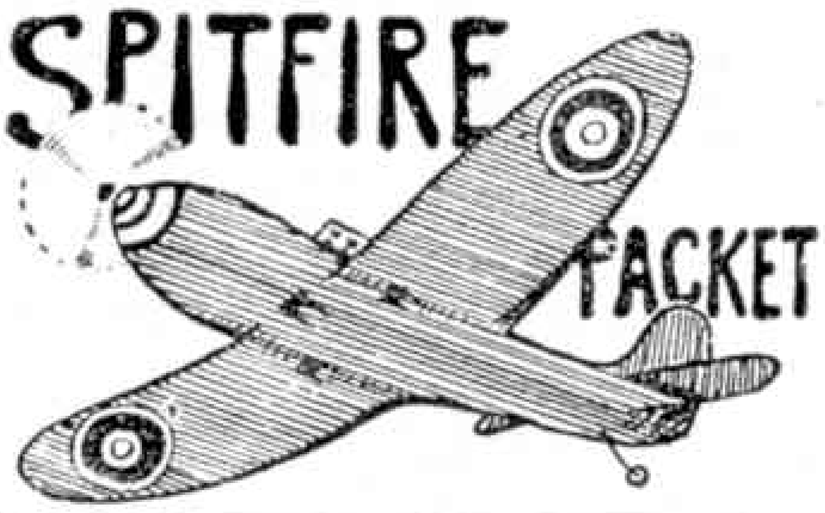

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Stamp Collecting

Colonial "Reprints"

By F. E. Metcalfe

IT had been our intention to go on discussing the stamps of our Allies, but the consideration of wartime printings of British Colonial stamps can hardly be put off any longer, such is the interest they have aroused amongst collectors, not only in Great Britain but also in the United States. Even their official designation "reprints" is causing comment, and we recently read an article in an American magazine which *inter alia*, stated that if British stamp dealers did not cease using the word, collectors abroad would be giving them a wide berth before long. Their understanding of course was that reprints refer only to stamps which have been printed, and issued, after their actual currency.

Now British dealers were not to blame for these war printings being called reprints in the first place, for it was the Crown Agents themselves who adopted the word in this connection. As far as they are concerned one word is as good as another, but it certainly is surprising that stamp dealers have so easily fallen into what is, for them, an error, and the sooner we all drop the word reprints in this connection, and use the correct term "new printings," the sooner will growing distrust be dissipated.

So here we have the first point we wish to make. War printings of colonial stamps are in no sense reprintings, as the term is understood philatelically, though they may differ in some respects from previous issues, but are simply new printings, prepared solely to replenish colonial post office stocks. These printings are nothing new; the attention of collectors and dealers has been drawn towards them owing to war conditions.

In the past approved dealers in Great Britain were only allowed to purchase stamps from the Crown Agents when they were first issued. Further supplies had to be ordered direct from the colonies themselves. Since the war, however, dealers have been able to obtain supplies of new printings in London also, and this is what has caused all the fuss.

And what of the stamps themselves? A dealer says he hears this question 10 times a day. "Will these war printings be catalogued?" And the only possible answer is, that some will and some won't. This is not very illuminating, so let us get down to details. Some of these war printings are already included in Gibbons' catalogue, and it is very interesting to notice that Scotts, the United St ates catalogue, have already declared a policy which means that many will receive recognition in that catalogue also; in fact they seem to be going further than Gibbons in this respect. It can be taken that perforation variations will be catalogued sooner or later, and we can give no better advice to readers who collect modern colonial stamps than to be on the look-out for any new perforations, for if these are discovered in time pence may procure stamps which may cost as many pounds later on.

Yes, pounds! Just look up the catalogue price of the last George V 3d. stamp of Nigeria. A mint copy of the ordinary perforation variety is listed at 9d.; the scarce perforation is marked £6, simply because it was overlooked while current. And there are others probably to be picked up even to-day. To mention a George VI stamp, we think there is something particularly good about the ½d. green Barbados, perforated 14, mint, if a copy can be found. That is just one; readers can look out for others.

It is not the job of stamp collectors to be concerned only with the financial side of the hobby, in fact such an attitude is the very antithesis of collecting, but there can be no harm in keeping a weather eye open for stamps needed for one's collection. That is a very different thing and surely permissible by any standard.

Apart from that very elusive ½d. green Barbados, perforation 14, the current stamps of Kenya, Gibraltar, Montserrat, Grenada, Fiji, Solomons and Gilbert and Ellice Islands should be carefully watched, for with stamps, as well as many other things, the commonplace of to-day is the rarity of to-morrow. A trite remark, no doubt, but true enough nevertheless.

And what about the new papers which are being used for these war printings? It has been stated that there have been no changes in this respect, but as a matter of fact there have been several, and one at least has been actually catalogued. We refer to the 2/- Bermuda, and there have been others, such as the 2d. and 3d. values of St. Kitts, the 3d. of Leeward Islands, and the 1/- and 5/- values of Bahamas, etc. Not many of these are likely to attain catalogue status, but they are collectable varieties, and of interest to the moderate specialist at least.

Lastly we come to shades, and here we must confess that we are quite at a loss to understand the policy of the catalogues. Gibbons have listed the 1d. Nigeria and the 2½d. Dominica, but ignored much greater shade differences in stamps like the 6c. Seychelles, the 2/6 Bermuda, the 6d. Grenada, etc.

But what does it matter really? If one likes shades, and many collectors do, catalogue or no catalogue, there is nothing to prevent our collecting them.

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Stamp Gossip

and Notes on New Issues

Argentina is proud of its newspapers, as it has every right to be, for its capital city Buenos Aires, scarcely a third the size of London, produces amongst many others, two that have every right to claim rank within the best half dozen in the world. They are "*La Prensa*" and "*La Nation*," and both have probably greater merits than the U.S.A. provincial "daily" which so modestly styles itself the "world's greatest." The founder of the oldest of these two great newspapers, "*La Prensa*," was the late Dr. Jose C. Paz, and Argentina was also honouring itself when it honoured its son by issuing a postage stamp to commemorate the centenary of his birth.

New stamps are to be issued by Curacao and Surinam to commemorate the birth of a daughter to the Crown Princess of Holland. The stamps are being printed in London, and are not expected to be ready until late June. If they meet with a similar reception amongst collectors to that accorded to previous Free Dutch issues they will be popular indeed.

These London-printed stamps of the "Free Governments" already form an attractive group, and one might do worse than start a collection of them. Most are modestly priced, and all should be in keen demand after the war by collectors of the various mother countries. They will never be cheaper than they are to-day, and any which become obsolete in the meanwhile cannot help rising in price.

We get an instance of this if we study what has happened since Algeria was occupied by our troops. The "Free French" overprinted were only in moderate demand a few months ago, but now that the Algerian market is open for these stamps, many of them have doubled in price this year. If the opening of a relatively small market can make such a difference there should be fireworks when the whole world is open.

Another of our illustrations shows a striking stamp from Madagascar issued to commemorate the "Imperial Fortnight," whatever that may be.

And what of our own colonial stamps this month? The most interesting of course are the two sets that have been issued for use in Eritrea, overprinted M.E.F., and Somalia, overprinted E.A.F. No doubt interested collectors will already have secured these London overprints, but will be wondering if they will be able to obtain the set overprinted M.E.F. in Cairo. The British postal authorities have advised dealers that a supply of these are on the way to London, and on arrival they will be offered to them. There is no mention of the actual quantity on the way, but there are certain signs which lead one to form the opinion that there will probably be enough for all who do not wait too long before purchasing.

In the article on page 175 we have mentioned that all reprints are supposed to be offered by the Crown Agents in London to approved British dealers. Well, that's the theory, but it doesn't seem to be working out that way. Dealers who have recently received parcels of stamps direct from Bermuda and Montserrat obtained stamps which have never been offered in London and in the case of Bermuda are not likely to be, and there's the rub.

It would appear that there had been some experimenting with the 2/– Bermuda stamp. Light blue paper subsequently used for the latest reprinting of the 2/– and 2/6 values had been resurfaced a dark vivid blue (S.G. No. 116a). A mere glance at the result shows one why the authorities did not consider the experiment a success and the stamps are already obsolete for, as already stated, the stamps which have been offered by the Crown Agents differ entirely, as there has been no resurfacing.

Regarding the Montserrat stamps, the current set was originally issued perf. 13; subsequently the ½d., 1d. and 1½d. were reprinted with perf. 14. These were put on sale in London, and no mention was made of any other values being reprinted, yet stamps received direct from Montserrat show that all values from ½d. to 5/–, except 2½d. and 5/–, have not only been reprinted, but have had their perforations altered also from 13 to 14.

Naturally there will be a bit of a scramble for the obsolete stamps, particularly dark blue 2/– Bermuda. It must be admitted that this stamp at least may not be too easy to obtain, as very few can have been imported, and as soon as the Crown Agents sent out supplies of the latest printing, which differed so radically in colour, dealers who cabled Bermuda received replies that none of the "dark blues" were left in stock.

There is news that the Gambia 2d. in new colours has already been dispatched to Bathurst, so the original 2d. value looks like being obsolete in the near future.

If there is one set of current colonial stamps which we think should be bought now by collectors of British colonial stamps, it is the current set of Gambia, for like Africa itself, there is always something new coming out of Gambia. A study of the catalogue shows that every issue of Gambia contains at least one scarce stamp, and there is no reason why the present attractive set should differ in that respect. We think that the 2/–, 4/– and 5/– values should be particularly watched for shade changes.

It is possibilities such as these which add the spice to the collecting of modern colonials.

It was only last month that we chronicled a new 1½d. stamp from Australia. Now we have received the interesting news that this stamp is to be changed, or has been already, and a portrait of King George VI is to be substituted for the existing one of Queen Elizabeth. Quick work indeed. Philatelists watch Australia.

At a Modern Aircraft Factory—

(*Continued from page 152*)

were short service officers between wars and had finished their time in the R.A.F., and had been taken on as test pilots and proved so good that they are more valuable in that job than they would be if war-flying.

Any of them is fairly competent to judge whether there is anything the matter with any machine of a batch of standard types. If there is any doubt, then the Chief Test Pilot, who is in charge of all the others, will take the machine up himself and if there is anything the matter he is pretty sure to find it. Then if there should be anything wrong, that machine is put back for the defect to be put right.

Those which are passed as perfect, and nothing else is good enough, are lined up waiting for A.T.A. pilots to fly them away to R.A.F. aerodromes or stores depots. I hope to be able to write something soon about the Air Transport Auxiliaries who supply these pilots. They are an astonishing bunch of men and women all unfit for war-flying and yet most of them able to fly anything which has an engine and wings. The A.T.A. is in fact a not-so-small Air Force by itself. They certainly have more pilots than any nation other than the Great Powers had before the war.

In the old happy days the Works Manager's job consisted chiefly in going around from shop to shop expressing pleasure or grief or rage according to what he saw there, and ticking people off if he did not like their work. In these days he has to be something very like a General Staff Officer of the first class on the supply side of an Army, because he has to keep tab on all the factories which are supplying his main shop, besides keeping an eye on stuff as it comes in and how it is put together, and how it goes out.

But I must say that all the Works Managers I know seem happy enough. That is probably because in these days people realise the need of Wings for Victory, and are putting their best work into their jobs in the aircraft factories.

A Polish Officer's Dublo Layout—

(*Continued from page 172*)

to take a tank engine and two four-wheelers. The turntable is of the "deck" type with deep girders as favoured by the G.W.R.; this pattern has no well, so that it is very suitable for miniature railway purposes.

The goods depot is the standard Hornby-Dublo structure and it is served by a track on both sides. Here the normal loading, unloading, and transhipment are carried out on the "bank," while for heavier loads there is an overhead crane spanning the lowest of the tracks in the yard. This crane, like so many of the other accessories, was made specially for the purpose. It is not a travelling crane, the gantry being fixed; but it is modelled on the type of crane with moving carriage, and is hand operated.

The diagram reproduced on the first page of this article, with the aid of the key on page 171, explains itself. With regard to the other illustrations it may be noticed that in certain details they do not correspond exactly with the description; this is no doubt because the drawings were prepared to show the scheme before construction was actually begun.

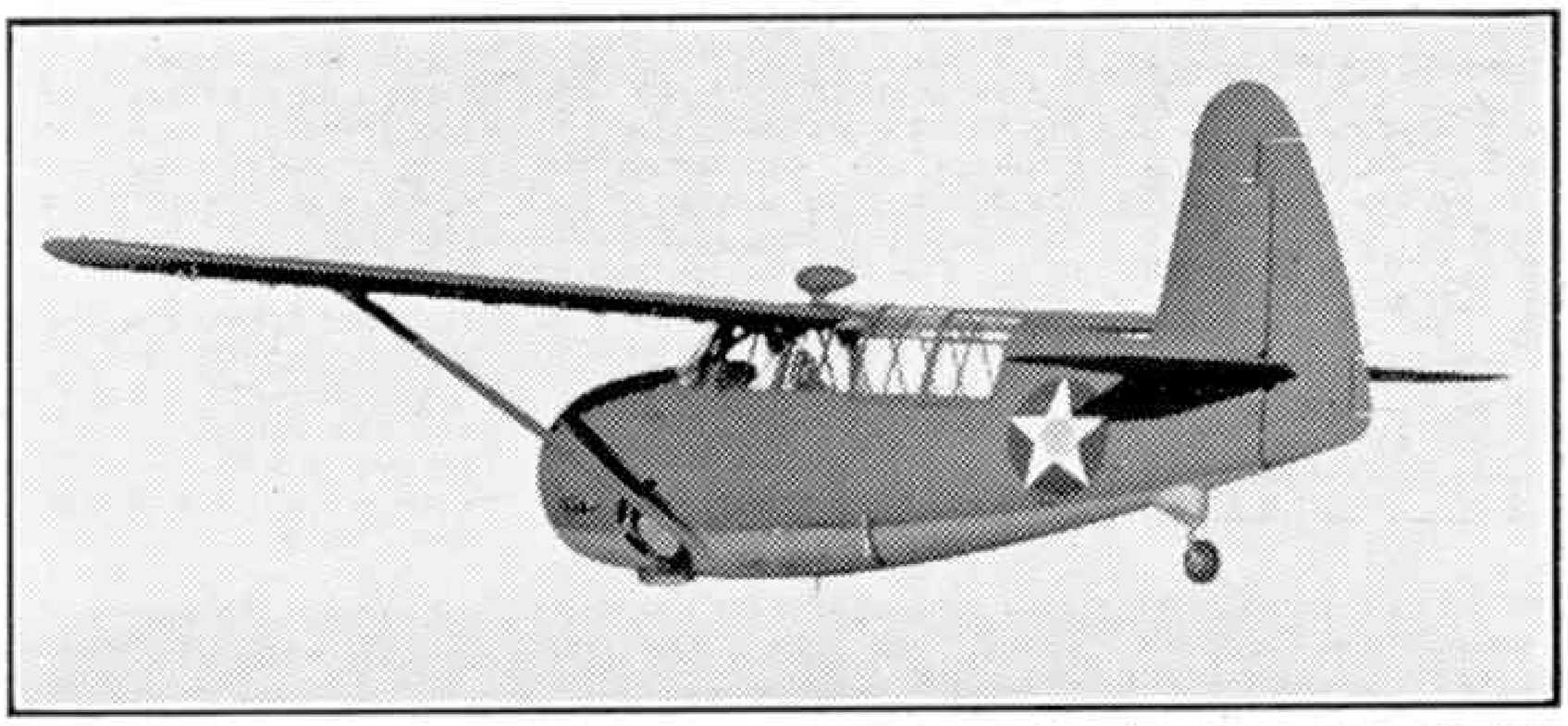
COMPETITION RESULTS

HOME

February Railway Quiz Contest.—1. J. M. Mather, Woodford. 2. A. J. Baker, Heathford. 3. D. Belton, Birmingham. Consolation Prizes: C. E. Wrayford, Bovey Tracey; H. Tripper, Ruislip; P. R. Wideham, Leicester.

February Photographic Contest.—1st Prizes, Section A: P. W. A. Petty, Carmarthen; Section B: A. R. Matthews, Chard. 2nd Prizes, Section A: F. N. Lyon, Plymouth; Section B: D. P. Toomles, Basingstoke. Consolation Prizes: J. Cowpertwait, Leicester; D. J. Williams, London S.W.15; T. A. Paling, Nottingham; P. Milne, Whyteleafe.

February Crossword Contest.—1. A. B. Partridge, Northampton. 2. C. E. Evans, Altrincham. 3. W. K. Cocking, Ilfracombe. Consolation Prizes: P. W. E. Bridle, Chichester; P. W. Mummery, Parkgate; P. Jones, London N.6.



The Curtiss 0-52 "Owl," one of the types of observation aircraft used by the U.S. Army Air Forces. It is a high wing, strut-braced monoplane with retractable undercarriage, an unusual combination, and has an exceptionally tall fin and rudder. Photograph by courtesy of Curtiss-Wright Corporation, Airplane Division, U.S.A.

OVERSEAS

July Errors Contest.—1. L. Malherbe, Johannesburg. 2. R. Cowan. Pietermaritzburg, Natal. 3. C. Poulton, Johannesburg. Consolation Prizes: B. Mason, Seapoint; B. Sykes, Johannesburg; D. Graft, Johannesburg.

August Shunting Puzzle.—1. E. A. Irvin, Wyong, N.S.W. 2. B. Oliver, Auckland, N.Z. 3. J. G. Cherry, Pretoria, S.A.

August Hidden Names.—1. R. Cowan, Pietermaritzburg, Natal. 2. M. K. Daly, Auckland, S.E.7. N.7. 3. G. Schmidt, Bloemfontein, S.A.

August Photo. Contest.—1st Prizes, Section A: R. M. Gameson, Johannesburg, S.A.; Section B: E. Brink, Johannesburg, S.A. Second Prizes, Section A: F. Willis, Toronto; Section B: K. Wain, Brisbane. Consolation Prizes: C. W. Holden, Sydney; A. T. James, Cape Town.

September Names Puzzle.—1. D. A. Harris, Westmount. 2. J. A. Markham, Windsor, Ont. 3. F. Jowett, Toronto. Consolation Prizes: J. A. Chappell, Newcastle; P. A. Gibbs, Durban, S.A.

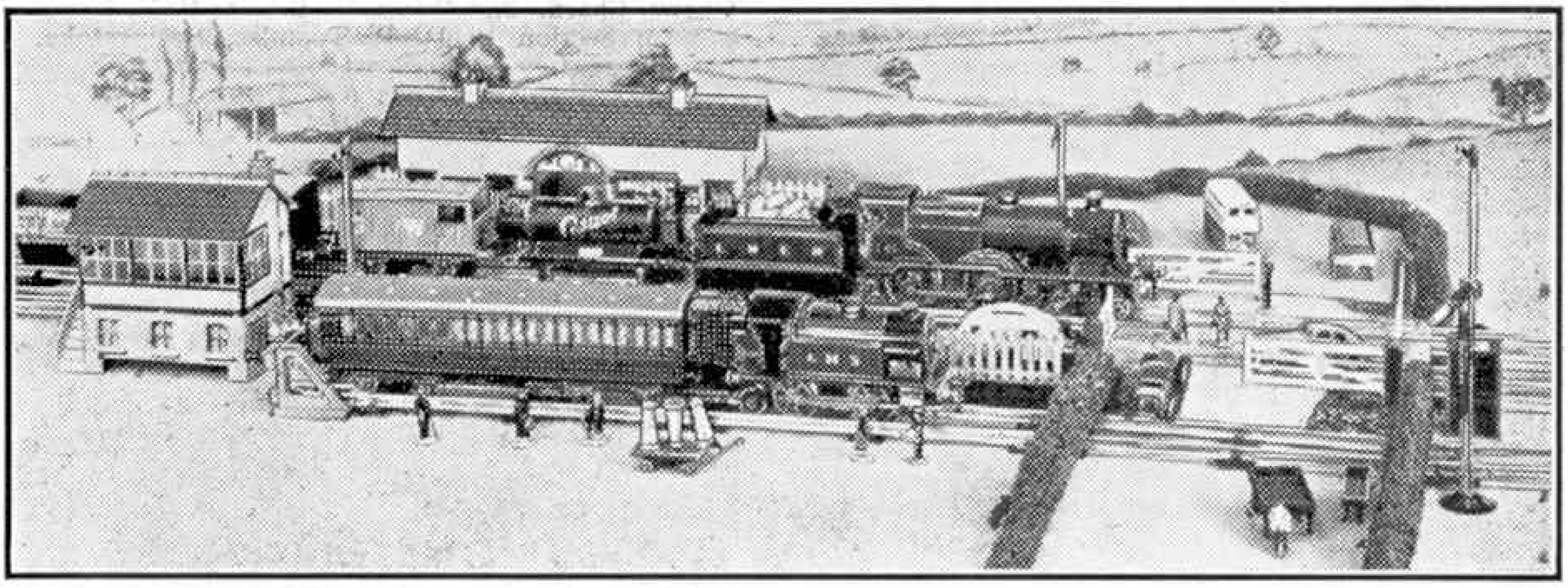
September Pointword.—1. R. Cowan, Pietermaritzburg, Natal. 2. S. Feneron, Peterborough, Ontario. 3. M. Laubscher, Johannesburg. Consolation Prizes: G. Bromley, Auckland, N.Z.; B. Barbyer, Johannesburg; S. Lynes, Cape Town.

September Photo. Contest.—1st Prizes, Section A: T. M. Lucas, Sydney; Section B: R. Smith, Johannesburg. Second Prizes: Section A: F. Teddington, Auckland; Section B: G. Williams, Cape Town. Consolation Prizes: A. Goldstein, Johannesburg; J. Bird, Perth; R. Parkinson, Johannesburg.

October Crossword Puzzle.—1. P. Byes, Kenilworth. 2. G. Muburgh, Clevemont. 3. P. A. Gibbs, Durban. Consolation Prizes: T. May, Johannesburg; E. Roberts, Brisbane, Queensland.

Competitions! Open To All Readers

What is Wrong with this Layout?



The illustration on this page appears at first sight to present a normal Hornby Train layout. On closer inspection, however, one or two errors will be discovered, and then it will be seen that there are in fact many mistakes. These have been introduced purposely, and the idea is to give readers a good opportunity of showing their sharpness of eye and their knowledge of railway matters. Competitors are required to find the mistakes that have been introduced into the picture, or as many of them as they can.

Entrants in this contest, which is open to all readers, are asked to make a list of the errors they have found, keeping their descriptions of these as brief as possible, and to write at the end of their entry the number of mistakes they claim. They should be careful also to write their names and addresses on each sheet of their entry.

There are the usual two sections, for Home and Overseas readers respectively, and in each there will be prizes of 21/-, 10/6 and 5/- for the best entries in order of merit. In addition there will be consolation prizes for other meritorious efforts, so that competitors should send in their entries, even if they fear that they have not found all the mistakes. Entries should be addressed "*May Errors Contest, Meccano Magazine, Binns Road, Liverpool 13*," and should reach here by 31st May in the Home Section and 30th September in the Overseas Section.

A "*Go as you Please*" Contest

Here is a fine competition that should bring an entry from every reader. We have called it a "*Go as you Please*" contest, for the simple reason that competitors may submit almost anything they wish. Thus they are able to choose the particular form of hobby or activity at which they shine most. It will be impossible for any reader to fail to enter because he is not "good at that kind of thing," since he will be able to decide the "kind of thing" for himself and to devise some original entry for this Novelty Contest.

Some readers are good at drawing or painting, and they are asked to submit their best efforts in this direction. Others who are not good at drawing, but like to write, may send in a short story of some kind, not exceeding 100 words, on any subject they like, such as their stamps, something of special interest they have seen, a place they have visited, or an adventure they have had. Boys in general do not like essays, but even an essay on some hobby or interest would form a suitable entry. Those who are not attracted by drawings, or do not think themselves good at writing, may submit details of an ingenious puzzle, which may be of the crossword type, or on the lines of the now popular Brain Teasers. Ideas for new contests also would be eligible.

In this contest the judges will base their decisions, not on the nature of the entries, but on the ingenuity and skill displayed in putting ideas into practice. Originality and attractiveness too will go far towards winning one of the handsome prizes offered.

Photographs will not be eligible in the contest, as there is a special competition for camera enthusiasts.

As usual there will be two sections, for Home and Overseas readers respectively. In each the chief prizes will be 21/-, 10/6 and 5/-, and there will be consolation prizes of 2/6 for all entries that are real novel and well worked out. The closing dates will be 31st May in the Home Section, and 30th September in the Overseas Section.

May Photographic Contest

This month's photographic contest is the 5th of our 1943 series, and in it, as usual, prizes are offered for the best photographs of any kind submitted. There are two conditions—1, that the photograph must have been taken by the competitor, and 2, that on the back of each print must be stated exactly what the photograph represents. A fancy title may be added if desired, but entries in which the second condition stated above is not observed will be disqualified. This is very important. Excellent entries in recent contests, most of them scenes in the countryside, in mountain country, or on the seashore, failed to win prizes because their senders did not state exactly where they were taken.

Entries will be divided into two sections, A for readers aged 16, and over, and B for those under 16. They should be addressed "*May Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.*" There will be separate sections for Overseas readers.

In each section prizes of 15/- and 7/6 will be awarded, together with consolation prizes for other good efforts. Closing dates: Home Section, 31st May; Overseas Section, 30th September.

Fireside Fun

"Do you know your mate's wheeling two barrow loads to your one?"

"Of course I do, but it's not my fault. I'm always at 'im about it."

* * * *

Billy: "Do you know, I had a duck egg for breakfast this morning."

Johnny: "My goodness, where did that come from?"

Billy: "From a duck of course, silly."

* * * *

Schoolmaster: "It pays to be painstaking. Remember, no one can take away from you anything you have learned.

Tommy at foot of class: "Yes, sir, but they can't take away what I haven't, can they?"

* * * *

"Hey, there's a bull running wild."

"Which way did it go?"

"You don't suppose I'm chasing the blessed thing, do you?"

* * * *

THIS MONTH'S HOWLER.

The masculine of heroine is kipper.

* * * *

BRAIN TEASERS

A policeman who had mislaid his notebook, an unlikely occurrence, as we admit, had occasion to note three motor car numbers, each of which contained the same four consecutive digits. In the first number these were in numerical order, in the second they were reversed and in the third they were mixed. When added together they made 12,300. What were the numbers?

* * * *

"Where was Magna Charta signed?"

"At the bottom miss."

DO YOU KNOW THESE AEROPLANES?

The following jumbles hide the names of eight aeroplanes made familiar to us by war operations. What are they?

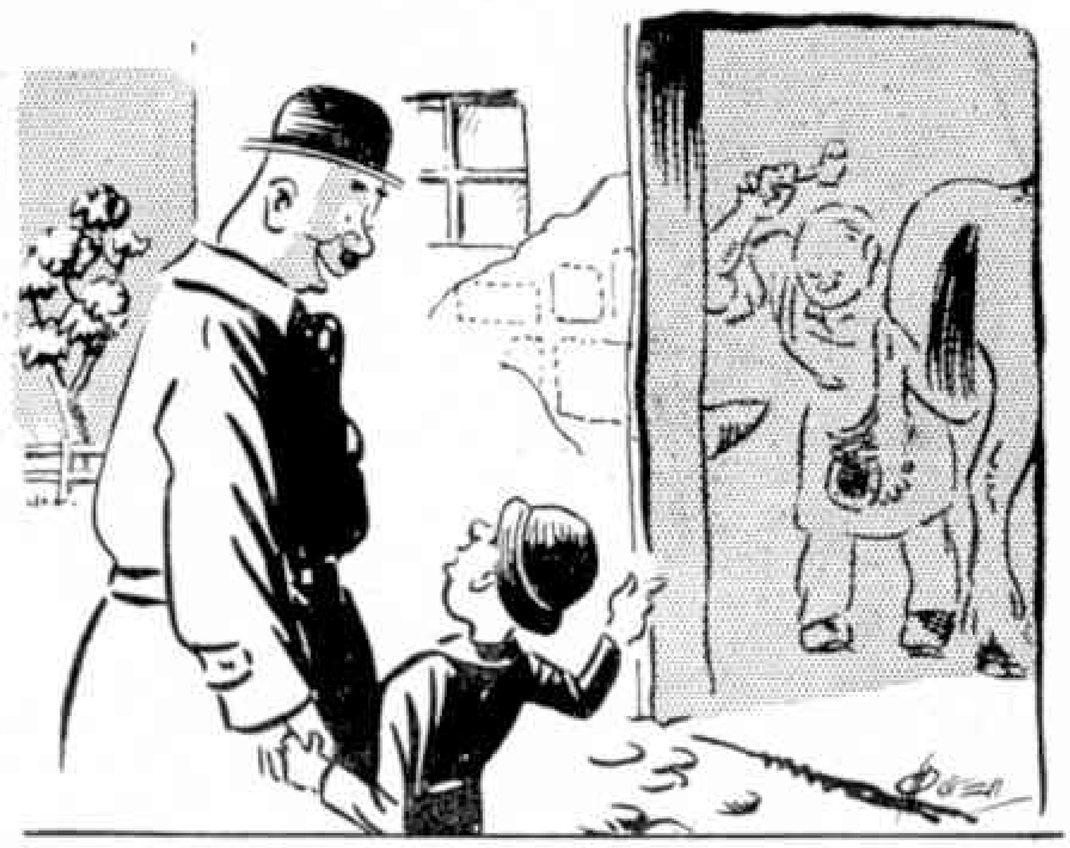
HPYOTON; TRIKVOMOS; ETSEMMSRSCHT1; DRILWIHWN; STOMUQIO; AMTOKHAW; DRUBTHELONT; ACRIADUA.

* * * *

THE LAZY FLY

A fly was resting on the end wall of a room 30 ft. long, 12 ft. wide and 12 ft. high. He was 1 ft. above the floor and half way between the side walls. He wished to visit a second fly on the opposite end wall who was 1 ft. from the ceiling and also equidistant from the side walls, but he did not wish to crawl a greater distance than was absolutely necessary. Which way did he go, and what was the distance he travelled?

* * * *



"I told you he made horses dad. He's just finishing another now, see."

* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES.

The Crazy Arithmetic puzzles of last month are solved by writing the numbers concerned in Roman notation. For instance 40 is represented by XL and on removing the X, which stands for 10, we have left L, 50. Similarly taking away V from IV obviously leaves 1. 100 is C and 5 is V; to multiply these we write CXV, which in Roman notation is 115. Finally 1,500 in Roman notation is MD, and this also represents Doctor of Medicine, a very high medical degree.

A watch that is right twice a day does not go at all; one that is never right is clearly the more desirable, for it must be going.

The time taken by the airman in our third puzzle last month to fly from Apia to Auckland is 10½ hours, so apparently he reaches the latter place at 8.30 on Thursday morning. Here the catch comes in, for on the way he crosses the International Date Line, and since he is travelling westward he must miss out a day. The result is that he arrives at 8.30 a.m. on Friday. He begins the return trip at 10 p.m. on the same day, but on crossing the Date Line in the opposite direction he comes back to the day before. The crossing is made early on Saturday morning, so that he reaches Apia once more at 8.30 a.m. on Friday, which has gone round the world to meet him again, so to speak.

The title of our last puzzle was *"The Keyword is the Answer Here."* This was literally true, for on substituting the numbers 0 to 6 for the letters of "Keyword" in order the sum given will be found to work out correctly. We wonder how many were sharp enough to realise that here we gave the answer before the puzzle!

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This Month's Special Articles

	Page
Air News	158
At a Modern Aircraft Factory	150
Books to Read	160
Club and Branch News	168
Competitions Page	179
Engineering News	153
Fireside Fun	180
From Our Readers	169
Have you ever thought about this?	156
Hornby Railway Company Pages	170–3
L.N.E.R. builds "Antelopes" for War Traffic	161
Meccano Model-Building Competition	165
New Meccano Models	164
Photography	157
Polish Officer's Dublo Layout	170
Power from the Air	162
Railway News	154
Saddle Tank "Austerity" Locomotive	149
Some Birds I have met	146
Stamp Collecting	175
Stamp Gossip	177
Suggestions Section	166

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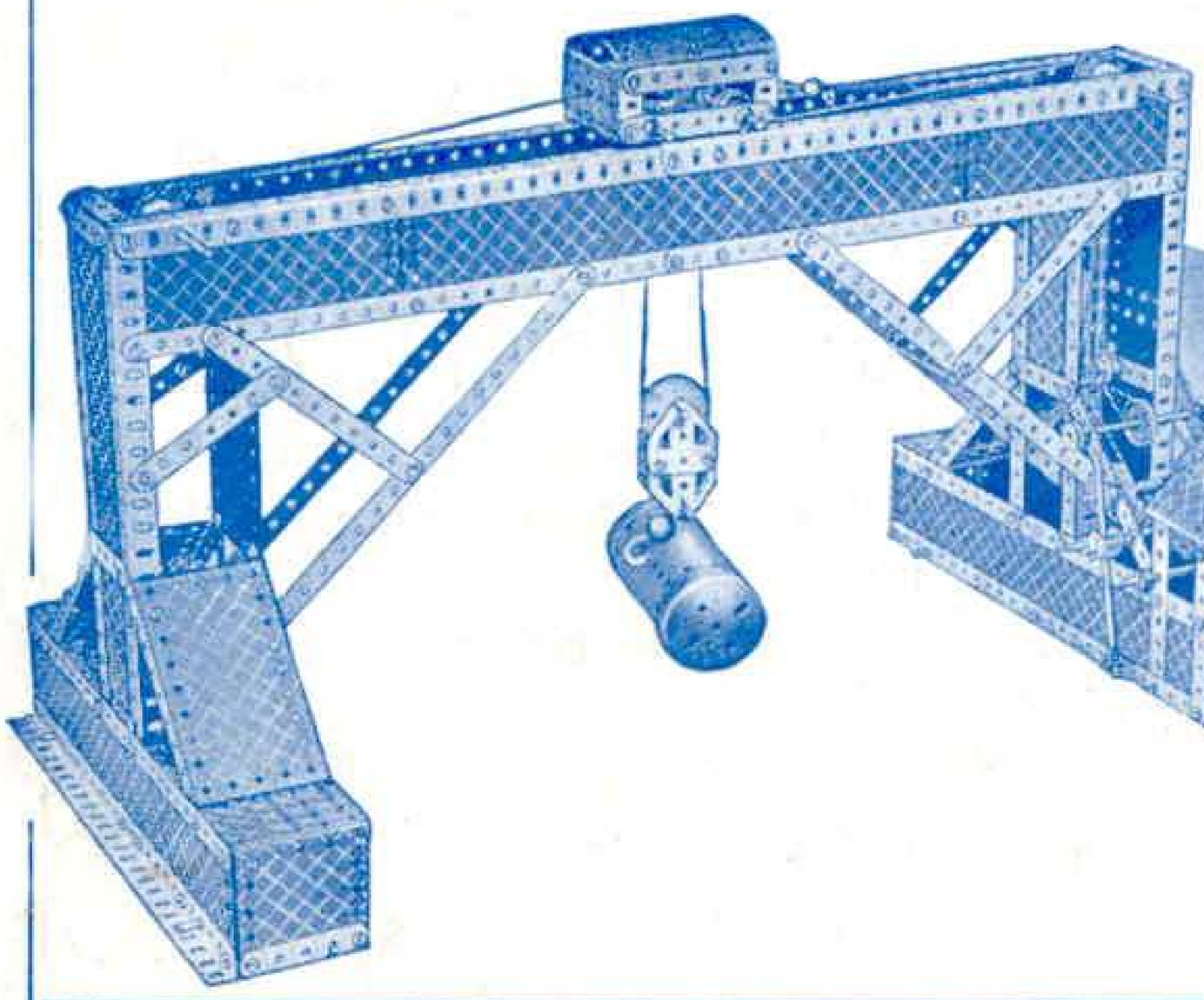

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